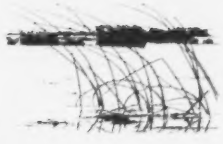
BUFFALO POUND WATER ADMINISTRATION BOARD

2010 annual report



CONTACT INFORMATION

The Buffalo Pound Water Treatment Plant is located approximately thirty kilometres northeast of the City of Moose Jaw, Saskatchewan, on Highway No. 301, seventeen kilometres north of the intersection with Highway No. 1.

The plant's mailing address is P.O. Box 1790, Regina, Saskatchewan, S4P 3C8.
The telephone number is 306-694-1377, fax 306-694-6050.

Plant management staff may be reached by email at the following addresses:

Ben Boots, Plant Superintendent: bboots@regina.ca
Dan Conrad, Assistant Superintendent / Chemist: dconrad@regina.ca
Gene Berezowski, Plant Foreman, gberezowski@sasktel.net.

The City of Regina maintains a web site containing information about the Buffalo Pound Water Treatment Plant. This may be accessed by going to http://regina.ca and then navigating to "Programs and Services" and then to "Water Treatment."

Information about the Buffalo Pound Water Treatment Plant is also available from the City of Moose Jaw's website http://www.moosejaw.ca/

BUFFALO POUND WATER ADMINISTRATION BOARD

2010 annual report

City of Regina | REGINA *Infinite Horizons*

Moose Jaw
SURPRISINGLY UNEXPECTED

2010 annual report

BUFFALO POUND WATER TREATMENT PLANT
ANNUAL REPORT - 2010

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BOARD CHAIRPERSON'S LETTER

On behalf of the management and staff of the Buffalo Pound Water Treatment Plant I am pleased to present this 2010 Annual Report of the Buffalo Pound Water Administration Board.

If a comparison is made between this 2010 Annual Report and the one for 2009 it can be seen that two of the three Buffalo Pound Water Administration Board members are new. In 2010 Mr. Ryan Johnson P.Eng. and Mr. Doug Richardson left the employ of their respective Cities. The vacancies created challenges as the new Board members needed to learn their duties and obligations in fulfilling their roles representing the joint city owners of the Buffalo Pound Water Treatment Plant.

The Board is grateful for the continued dedication of plant management and staff in efficiently operating and maintaining the treated water supply for Moose Jaw and Regina. Several times every day customers give a quiet vote of appreciation for the work done ensuring safe, high quality water is available for their use.

Derrick Bellows, P.Eng.
Chairperson
Buffalo Pound Water Administration Board

BUFFALO POUND WATER ADMINISTRATION BOARD
2010 ANNUAL REPORT

INTRODUCTION

This report summarizes the activities and major events at the Buffalo Pound Water Treatment Plant during 2010. The report outlines the Mission and Goals, achievements and areas of concern. It is intended as an information source for city administration personnel, elected officials and the general public. This report also contains the Drinking Water Quality and Compliance Report required by provincial regulations.

BUFFALO POUND WATER ADMINISTRATION BOARD

The Buffalo Pound Water Administration Board was created in 1951 by an official agreement between the City of Regina and the City of Moose Jaw. In accordance with the agreements the Board is composed of two senior members of the City of Regina administration and one senior member of the City of Moose Jaw administration.

BOARD MEMBERS

Mr. D. Bellows, P.Eng., Chairperson
Director of Environmental Services
Public Works Division
City of Regina

Mr. Mokles Rahman, P.Eng.
Director of Engineering Services
City of Moose Jaw

Mr. Chuck McDonald, B.A., B.B.Admin, CMA
Director, Financial Services
City of Regina

WATER TREATMENT PLANT MANAGEMENT

Mr. B. Boots, FEC, P.Eng.	Plant Superintendent
Mr. D. Conrad, P.Chem.	Assistant Superintendent/Plant Chemist
Mr. E. Berezowski	Plant Foreman

MISSION AND GOALS

MISSION

* To provide for the cities of Regina and Moose Jaw a reliable and affordable supply of safe, high-quality drinking water which meets the needs and expectations of consumers.

GOALS

* Treated water that meets the quality expectations of the citizens of Moose Jaw and Regina, and meets or exceeds all government regulated parameters.

* Operational practices and controls that ensure a continuous and safely-treated supply of water within an environmentally-responsible and cost-efficient operation.

* Judicious monitoring of the treated water from the plant to the end of the cities' distribution systems. Appropriate monitoring of the water in Buffalo Pound Lake, the Upper Qu'Appelle River and Lake Diefenbaker to identify long-term trends and areas of concern to protect the water supply.

* Water quality research to identify possible chemical and microbiological contaminants as well as to test and implement the best available treatment technologies, thus ensuring that the water treatment plant can meet current and future expectations for regulated parameters.

RESOURCES

WATER SOURCE

Water for Regina and Moose Jaw is taken from Buffalo Pound Lake, a shallow reservoir in the Qu'Appelle Valley. The lake is 29 km long, 1 km wide but has an average depth of only 3 metres. The surface area of Buffalo Pound Lake is 2,900 hectares inferring it has a capacity of 90 million cubic metres at the "full supply level" of 509.3 metres above sea level. Water levels in Buffalo Pound Lake are controlled by the Saskatchewan Watershed Authority and maintained by the release of water from the Qu'Appelle Dam on Lake Diefenbaker. Mean annual water releases of 5 to 1 cubic metres per second are typical. Thus the average residence time of water in the lake varies from six to thirty months. Very little water enters Buffalo Pound Lake from rain or spring runoff except in abnormally wet years. The principal source of the water is rain and snow-melt in the mountains of Alberta, collected by various tributaries draining to the South Saskatchewan River and stored in Lake Diefenbaker. As such, the water is potentially affected by discharges from point sources (upstream cities) and non-point sources (agricultural and recreational).

Buffalo Pound Lake is generally free of industrial pollution but is naturally rich in nutrients (phosphate, nitrogen and dissolved organic carbon) which encourage the growth of phytoplankton (typically diatoms in the winter and green algae or cyanobacteria in the summer). Weed growth can also be extensive. Algae and weeds pose many treatment challenges such as high chemical demands and undesirable tastes or odours. The lake and watershed appear to also be impacted by ground waters infusing minerals.

PLANT TREATMENT

Raw water from Buffalo Pound Lake passes through a series of treatment stages designed to remove impurities such as algae, bacteria, clay particles and dissolved organic materials. The objective of this treatment is to produce water that is clear, colourless, odour-free, aesthetically pleasing and safe to drink.

The treatment process consists of six stages: chlorination, cascade de-gasification, coagulation flocculation, clarification, filtration and carbon adsorption.

Lake water enters a pumping station located on the south shore of Buffalo Pound Lake through two submerged intakes. Raw water is chlorinated and then pumped to the treatment plant via two pipelines connecting the pumping station to the main treatment plant. The pipelines are 1.05 and 1.35 metres in diameter, extend a distance of 3,000 metres and rise 82 metres. After reaching the plant, water is initially divided into two streams, each of which has cascade de-gasification, coagulation flocculation and clarification. The streams are then recombined for the final stages of treatment, including filtration, carbon adsorption and further chlorination.

Cascade operation is normally used during periods of excessive dissolved gas levels in the raw lake water. Excessive dissolved gases are most commonly produced by photosynthetic bacteria and algae. During cascade de-gasification, the water falls over a series of steps which releases excess dissolved gasses and prevents the formation of gas bubbles in later treatment processes. Clarification and filtration processes could be impeded by gas bubbles that attach to particles of floc, causing them to float, rather than sink, and by causing air binding in the filters.

If conditions warrant, powdered activated carbon (PAC) is added to reduce taste and odour. The use of powdered activated carbon while relatively infrequent is occasionally necessary when granular activated carbon contactors are off line or to temporarily reduce the odour loading when the contactors are on-line.

Coagulation and flocculation are the next steps in treatment. Aluminium sulphate (alum) is vigorously mixed with the water. In the process of coagulation, the alum neutralizes surface charges on particulate matter contained in the water and forms a fluffy precipitate (floc) that entraps suspended algae and clay particles. The water is then stirred slowly in flocculation tanks to allow floc particles to become larger and denser prior to their removal.

The floc-bearing water then flows through clarifiers, where most (more than 95%) of the floc with its entrapped impurities is allowed to settle by gravity to the bottom while clear water is constantly removed from the top. Settled floc is removed from the clarifiers as sludge and pumped to holding lagoons

where it is further separated into clear water (returned to the lake) and solid sludge (removed for disposal).

Any floc that was not removed by clarification is separated in the filtration stage. Water is passed through mixed-media filters consisting of a top layer of coarse anthracite followed by successive layers of fine silica sand, and even finer garnet sand. Any remaining particulate matter or floc is trapped by the filters. Filters are cleaned by backwashing with clean water. The filtration step completes the removal of particulate impurities. The removal of dissolved organic impurities, which are responsible for taste and odour, is accomplished next in the carbon adsorption stage of treatment. Large rectangular tanks (contactors) contain granular activated carbon (GAC) to a depth of 3 metres. Water is lifted by Archimedes screw pumps from the bottom of the filters and taken to the top of the contactors where it is allowed to flow by gravity down through the GAC. GAC contains many microscopic pores which adsorb dissolved chemical impurities. Water is in contact with the GAC for 15 to 30 minutes, depending on flow rates, and emerges freed of the dissolved organic materials which cause objectionable taste and odour. The GAC filtration process at Buffalo Pound was designed for taste and odour removal and is used during periods of poor taste and odour in the raw water; the normal period of operation is from May until December.

All stages of water treatment are now essentially complete. Prior to delivery by pipeline to the consumers, chlorine levels are adjusted, if necessary, to provide adequate disinfection and to counteract any possible contamination encountered during its travel to the cities' reservoir and distribution systems. Water delivered to the City of Moose Jaw is also fluoridated prior to pumping.

The carbon used in the contactors retains its effectiveness for taste and odour improvement up to six months, after which time it must be regenerated or replaced. GAC is a relatively expensive treatment component and it has been found to be cost effective as well as environmentally responsible to regenerate the used GAC rather than to discard it and purchase new. Regeneration is accomplished by heating the spent GAC to 850°C in an oxygen-free atmosphere contained in a fluidized bed gas-fired furnace. Spent GAC is transferred by pipeline in a slurry from the contactors to the furnace, regenerated to original specifications, and returned to the contactors for reuse. Carbon regeneration is usually performed at Buffalo Pound from mid-October to mid-April.

ENVIRONMENTAL PROTECTION AND CONSERVATION

The Buffalo Pound Water Treatment Plant, like any large industrial facility, has the potential to affect the environment. The plant has facilities in place to handle all process wastes including alum sludge, off gases from the carbon regeneration facility, laboratory wastes, various solid wastes generated by plant operations, and sewage. The plant uses a considerable quantity of electrical energy in its operation; conservation efforts give returns in the form of reduced demands on the environment and lower operating costs.

A series of sludge lagoons is used in the treatment of the alum sludge waste stream. This form of sludge management can be very effective in ensuring that the sludge is retained. However, the plant's lagoons are identified as being undersized in the 2005 and 2010 Water Works System Assessments. Sludge is exposed to a natural freeze-thaw cycle that dewaters it to produce a nearly dry granular material which is transported to a landfill site. This material contains some plant nutrients, namely nitrogen and phosphorous which could make it suitable for land-spreading. Land-spreading the sludge allows the water treatment plant to safely dispose of a waste product while simultaneously adding nutrients to the soil. Buffalo Pound is one of the few water treatment plants in Canada with the ability to manage waste sludge in this manner.

The natural gas-fired furnace in the carbon regeneration facility produces off gases which are thoroughly scrubbed before release to the atmosphere.

Waste disposal agencies are contracted to handle laboratory wastes and solid wastes generated by the plant. As it becomes necessary, firms specializing in hazardous waste disposal are contracted to dispose of chemical wastes.

Sewage generated by the plant is pumped to treatment and evaporation lagoons located on plant property. The primary lagoon has a geotextile fabric and bentonitic clay liner to prevent seepage.

Efforts are continually made to utilize electrical energy in the most efficient fashion possible. The biggest consumers of power are the large pumps located at the lake pumping station and the units that pump water to the cities.

WATER QUALITY MONITORING

A well-equipped accredited laboratory is located on site and used to monitor the quality of raw and treated water as well as water quality at several intermediate steps in the treatment process. Major process control parameters (turbidity, pH, chlorine residual, particle counts, dissolved oxygen and temperature) are monitored continuously by instrumentation communicating with the plant process computer system. Analyses are performed for most regulated parameters on a daily to monthly schedule; for other parameters (most trace-level organics and metals) samples are sent to commercial laboratories. Analytical results are compared to Canadian Federal guidelines and to Saskatchewan Ministry of Environment (MOE) objectives. All criteria for safe drinking water were satisfied by the Buffalo Pound Water Treatment Plant in 2010.

Analyses for a wide variety of physical, chemical, and microbiological parameters are performed in the Buffalo Pound Laboratory. Some 65 different constituents are routinely determined and approximately 25,000 tests are done yearly. The 2010 results are summarized in Appendix 1, together with results for metals and organics obtained from commercial laboratories.

The quality of the regenerated granular activated carbon is monitored by plant staff for a variety of physical and chemical parameters.

A vigorous in-house quality control program is maintained to ensure data generated by the Buffalo Pound Water Treatment Plant Laboratory is valid. The laboratory is accredited by the Canadian Association for Laboratory Accreditation (CALA) for 31 different chemical and bacteriological parameters.

PLANT OPERATIONS AND MAINTENANCE

WATER PRODUCTION

Water Production and sales (in megaliters) were as shown in Table 1. (See also related Graphs 1 and 2.) Total sales to the cities in 2009 were 25,957 ML to Regina and 5,351 ML to Moose Jaw. Sales to Regina decreased 5.8% from 2009, and sales to Moose Jaw decreased 10.8%.

Sales to the SaskWater Corporation in 2010 decreased by 1.0%, to 183 ML. Sales to SaskWater represent less than one percent of the plant's production. It is worthwhile to note that the total amount of water sold to the SaskWater Corporation in all of 2010 is equivalent to 30 hours of combined sales to Regina and Moose Jaw in July.

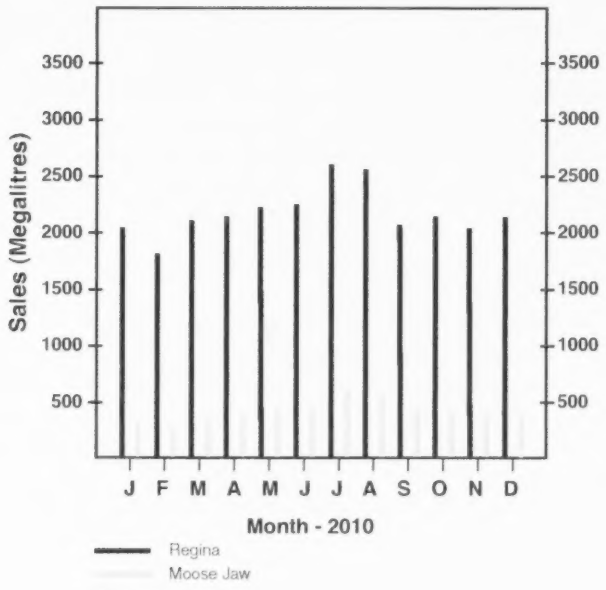
Graph 3 shows annual water production by year since the plant began operation in 1955.

Table 1: 2010 WATER SALES (MEGALITRES) BUFFALO POUND WATER TREATMENT PLANT

MONTH	REGINA	MOOSE JAW	SASK WATER CORP.
January	2057.4	373.1	12.4
February	1847.1	356.1	11.4
March	2104.5	389.1	12.8
April	2024.9	395.6	14.8
May	2219.1	490.1	16.0
June	2153.6	480.3	16.1
July	2601.3	604.0	19.2
August	2556.3	583.0	26.8
September	2073.6	443.6	12.6
October	2139.3	420.8	12.0
November	2033.6	405.9	15.7
December	2146.5	409.0	13.3
Totals	**25957.3**	**5350.5**	**183.0**

Graph 1

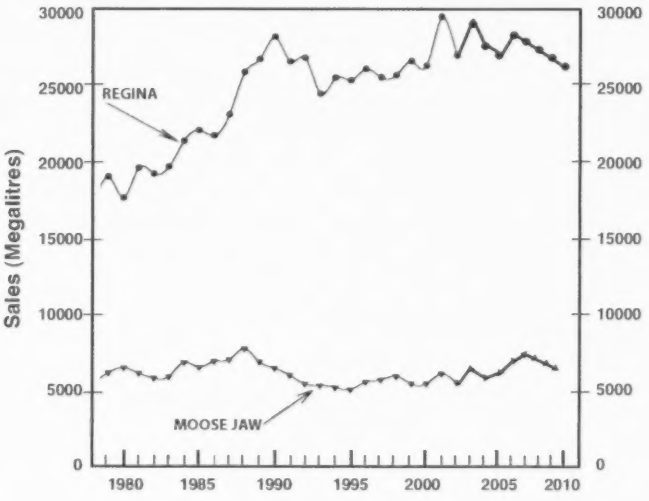
BUFFALO POUND WATER TREATMENT PLANT
MONTHLY SALES TO REGINA & MOOSE JAW - 2010



TOTALS
Regina **25,957.3 ML** Moose Jaw **5,350.5 ML**

Graph 2

BUFFALO POUND WATER TREATMENT PLANT
ANNUAL SALES TO REGINA & MOOSE JAW
1979 - 2010



Graph 3

BUFFALO POUND WATER TREATMENT PLANT
ANNUAL RAW WATER CONSUMPTION
1955 - 2010

PLANT OPERATIONS

The processes employed at the Buffalo Pound Water Treatment Plant are modified during the year as determined by the water quality in Buffalo Pound Lake.

Ice cleared the lake on April 9, 9 days earlier than the average. Chemical dosages were generally low throughout 2010, even lower than 2009. The granular activated contactors were in operation from May 20 to December 6.

In the fall of 2010 the lake froze over November 19.

CARBON REGENERATION FACILITY

The carbon is regenerated in the winter so that it can be used to remove taste and odour from the water in the following summer. The 2009 / 2010 regeneration season was from October 13, 2009 to February 12, 2010. The 2010 / 2011 regeneration system commenced October 27, 2010. Operation of the furnace was very smooth throughout the season.

MAINTENANCE AND CAPITAL PROJECTS

Effective maintenance plays a key role in keeping the water treatment plant running efficiently producing high quality water. All vessels are drained, cleaned and inspected at least annually. All critical plant equipment is inspected, tested and maintained at least annually to help ensure satisfactory operation during peak flow demands. All water quality monitoring instruments are checked or calibrated frequently. The results from major on-line instruments are compared to laboratory instruments.

Several projects were completed with funds from the Capital Replacement Reserve for a total cost of $226,841. Progress was made on the replacement of the filter valves on the original eight mixed-media filters. Additional progress was made on the project updating the process and instrumentation drawings. One of the plant's two trucks was replaced. A project to add safety mechanisms at the Lake Pumping Station chlorine system was started. The Capital Replacement Reserve also funded the Waterworks System Assessment required by provincial legislation.

In addition to the projects funded by the Capital Replacement Reserve other projects were completed. Plant staff and staff from Associated Engineering upgraded the software in the SCADA servers and replaced the clients. The East Screw Pump was overhauled; the gearbox and motor were replaced with rebuilt units, the upper thrust bearing unit was overhauled, the gearbox sheave and drive belts were replaced. The screw pumps were re-painted.

One of the backup Service Water pumps was overhauled in house. The plant's turbidimeters and particle counters were inspected and maintained by manufacturer's representatives.

A leak on the six inch potable water line that used to provide water to the plant houses and currently supplies water to the Buffalo Pound Provincial Park was repaired in February. Care had to be taken not to damage the three inch raw water pilot plant line that contains the fiber optic cable between the plant and the lake pumping station.

The carbon regeneration plant annual overhaul was augmented with all actuators and valves being rebuilt off site and reinstalled.

A cross-brace on the 72 KV power line to the lake pumping station was damaged in the high wind storm in early April; the brace was replaced.

The motor from LPS pump "F" was sent away for an overhaul. The unit was reassembled October 20.

A new air-release valve was installed on the west raw water line to replace the one that had been damaged by freezing. The raw water pipeline vault vents were fitted with devices to minimize air exchange and freezing in the vault.

WASTEWATER FACILITY

The clarifier underflow removes particulate matter (alum sludge) from the raw water. The effluent stream is directed to alum sludge lagoons where the sludge is deposited and the clear water overflow returns to Buffalo Pound Lake. The sludge from the northwest and southwest summer lagoons that had been previously stockpiled was removed to the Moose Jaw landfill. The wet weather prohibited removal of sludge from any lagoons.

REGULATORY AND GOVERNMENTAL AFFAIRS

In December 2002 the provincial government introduced new Water Regulations dealing with water and wastewater facilities. These comprehensive regulations are intended to improve water quality and reporting accountability. Saskatchewan Environment conducted two inspections of the plant in 2010 in March and August; no deficiencies were noted.

The plant's Permit to Operate expired December 31, 2010. In accordance with the regulations a request for a new permit was submitted by plant management. A new permit expiring December 31, 2012 was received.

One requirement of the regulations is that the laboratory analytical work required by a water treatment plant's Permit to Operate must be done by an accredited laboratory. The Buffalo Pound laboratory fulfilled all requirements to maintain accreditation from the Canadian Association for Laboratory Accreditation (CALA). The laboratory participated in four sets of proficiency test analyses and underwent an independent audit in November.

The Water Regulations require that the plant submit results of the weekly bacteriological, monthly trihalomethane and quarterly major ion analyses promptly to Saskatchewan Environment and that a Drinking Water Quality and Compliance Report be published annually. The required Drinking Water Quality and Compliance Report is provided in the Appendix. The Buffalo Pound Water Treatment Plant met all sample submission requirements of the plant's operating permit. The plant is in full compliance with the Water Regulations.

In accordance with the Water Regulations a Waterworks System Assessment was completed by an independent engineering consultant.

Plant operations are subject to the federal National Pollutant Release Inventory (NPRI) Legislation, Canadian Nuclear Safety Commission (CNSC), as well as the Environmental Emergency Regulations. The required inventory submissions were made to the NPRI program. Radioactive substances are used in the laboratory's electron capture detectors. Although the licence requirements for electron capture detectors have been terminated by the CNSC, swipe tests are still conducted as part of the general maintenance program. Swipe tests ensuring the integrity of these detectors were sent to Saskatchewan Labour for analysis; no leakage above the guidelines was detected.

HUMAN RESOURCES

In 2010 the Buffalo Pound Water Treatment Plant employed a total staff of 28, consisting of three out-of-scope managers, nine operating staff, five laboratory technologists, five journeyman maintenance persons, four maintenance persons, and two labourers.

The in-scope staff is represented by the Communication, Energy and Paperworker's Union Local 595. Proposals were exchanged on April 6 and more discussions were held on April 27 and 28 resulting in a memorandum of agreement for a one-year contract.

The Buffalo Pound Water Administration Board was presented with a Certificate of Achievement Award from the provincial Worker's Compensation Board for the plant's safety record. This is the twenty-third consecutive year the plant has been presented with this award. During 2010 there were no lost-time accidents or medical-aid case injuries.

Plant staff participates in the Regina Civic Employees Pension Plan. The plant superintendent attended many meetings to attempt to address the Pension Plan's large unfunded liabilities. The issue remains unresolved as of yearend.

WATERSHED PROTECTION

The Buffalo Pound Water Treatment Plant continues to be involved in consultation processes dealing with watershed protection in the Upper Qu'Appelle River and Buffalo Pound Lake. The Watershed Advisory Committee finalized the Upper Qu'Appelle River and Wascana Creek Watersheds Source Water Protection Plan. The organization leading source water protection is known as WUQWATR (Wascana Upper Qu'Appelle Watersheds Association Taking Responsibility, Inc.) The plant superintendent attended the annual meeting of the Upper Qu'Appelle Watershed Advisory Committee. The Saskatchewan Watershed Authority wants to plan for a flowrate of up to 25 cubic meters per second in the Upper Qu'Appelle River; more than three times the volume the current channel can presently accommodate. One suggestion is that construction and operation of a channel out of the valley, on the south side of the river has similar life-cycle costs as rehabilitating the original constructed channel and protecting the 'natural' river from erosion.

MISCELLANEOUS

Six staff attended the annual Saskatchewan Water and Wastewater Association Annual Conference in November.

Three Buffalo Pound employees, one a member of the Operator Certification Board, participated in a consultation process of SIAST's Water and Wastewater Technician program.

The City of Regina conducted a pumping energy efficiency study looking at pumps at the Buffalo Pound Water Treatment

Plant as well as at the City of Regina reservoir pumping stations.

The Assistant Superintendent / Plant Chemist was invited to join the Program Technical Committee for the National Conference on Drinking Water which was held in Saskatoon October 30 to November 2, 2010.

The plant superintendent was invited to give a presentation on water issues and the plant at the Moose Jaw Rotary meeting February 22.

Meetings of the City of Regina Water Quality Emergency Response Plan Task Force were held in April and October.

A brush fire occurred in Buffalo Pound Provincial Park on April 9 approaching within 400 meters of the raw water pump station. Extremely high winds that day caused some roof and subsequent vehicle damage.

On April 30 the plant was toured by attendees at the Association of Professional Engineers and Geoscientists annual general meeting. Later that same day the Mayor and five other officials from the city of Regina toured the plant.

A crane fell into Buffalo Pound Lake at the highway number 2 causeway on August 28, 2010. Plant management checked the site that afternoon and discussed the remedial actions taken with the province's environment inspector on the day of the incident and until the crane was removed from the lake. Laboratory staff had recently completed method development for "BTEX" analysis (benzene, toluene, ethylbenzene and xylene). This method allowed the laboratory to screen raw lake water samples for gasoline or hydrocarbon contamination. No levels exceeding the detection limit of 1 ug/L for any BTEX parameter have been detected since the commencement of monitoring. Monitoring for BTEX compounds continue on a regular basis, monthly in the winter, more frequently in the summer.

The Buffalo Pound Water Administration Board initiated an "Organizational Assessment and Design Review" process with the assistance of a consultant facilitator. The Board Chairperson volunteered to take Director's Training from the Institute of Corporate Directors.

RESEARCH AND ANALYTICAL PROGRAM

SUPPLEMENTAL MONITORING

In addition to process monitoring which is required under the terms of the operating permit issued by Saskatchewan Environment, the Buffalo Pound Water Administration Board undertakes supplementary monitoring as follows:

* Distribution System Monitoring for the City of Regina and Moose Jaw
* Buffalo Pound Lake Monitoring
* Upper Qu'Appelle/Lake Diefenbaker Monitoring

The distribution system monitoring program surveys twelve locations in Regina and five in Moose Jaw on a monthly basis. This data assists the cities in their operations and required monitoring. Laboratory resources are also used on an occasional basis to assist the cities in responding to complaints and other issues related to water quality.

Monitoring of Buffalo Pound Lake provides information on the quality of the raw water supply; this facilitates the operation of Plant processes. Considering this longer-term data base is invaluable in evaluating the health of our drinking water source. The eutrophic status of Buffalo Pound Lake and its production of algae blooms that challenge our water treatment processes are well known. The historical data base of lake water quality coupled with hydrological records has demonstrated that moderate inflows from Lake Diefenbaker released by the Qu'Appelle Dam are beneficial in reducing the residence time of water in Buffalo Pound Lake and so moderating the potential for algae blooms. Unfortunately, high water flows through the light alluvial soils of the Upper Qu'Appelle River promotes erosion and the transport of phosphorus, an essential nutrient for algae growth into Buffalo Pound Lake. Cyanobacteria often predominate in natural waters that are deficient in nitrogen as many of those species can "fix" atmospheric nitrogen. By limiting phosphorus, the growth advantage of cyanobacteria over the more benign green algae is reduced.

Monitoring of the Upper Qu'Appelle River / Lake Diefenbaker system provides a database of water quality information that may allow an assessment of long-term water quality trends. The plant's database is frequently requested by provincial agencies and university researchers.

HALOGEN SOURCES OF DISINFECTION BY-PRODUCTS

Chemical disinfectants can react with the naturally occurring compounds found in water and generate new compounds that might be of concern to human health. Some of these compounds contain bromine and iodine (which with chlorine are termed halogens) and can potentially be incorporated into disinfection by-products. Although the individual bromine and iodine by-products are not presently regulated, it is prudent to evaluate their potential for formation and identify their sources. A project to better understand these novel by-products was initiated in 2009.

The project was expanded to include not only identifying the sources and levels of bromine and iodine but to study their fate and effects during water treatment as well.

The results from watershed sampling for halogens in 2009 showed that bromine (occurring as bromide) levels were highest in Buffalo Pound Lake water. This was attributed to the impact of ground water which is enriched in chlorides and bromides from its passage through glacial till soils and from contact with marine Cretaceous bedrock.

The exceptionally wet weather experienced during the spring and summer of 2010 produced exceedingly high runoff within the Upper Qu'Appelle River watershed. The levels of bromide in the Upper Qu'Appelle River were 5 to 10 times higher than those measured in 2009. During this time diversions of water from Lake Diefenbaker were reduced, but eventually this water did have an impact on bromide levels within Buffalo Pound Lake raising them to higher levels not normally encountered. Bromide levels in Buffalo Pound Lake rose from the normal levels of 40 ug/L to 80 ug/L in August and to 120 ug/L in late November.

Within the treatment plant bromide is oxidized to hypobromous acid which in turn reacts with naturally occurring organic matter to form new by-products. Some portion of the by-products, specifically the higher molecular weight compounds is removed by the alum coagulation process. Additional removal of lower molecular weight compounds is achieved by the granular activated carbon contactors. After 200 days of operation a large portion of the identified bromine containing by-products were still removed. Some lower molecular weight compounds were less effectively removed after that time. Residual bromine (as hypobromous acid) and organic carbon remain in the final treated water and so the final levels of the non-regulated by-products may still increase. This ultimate reaction must still be determined in future work.

PERSONAL CARE PRODUCTS AND PHARMACEUTICALS IN BUFFALO POUND LAKE

We all use various pharmaceuticals and chemicals in our everyday lives. These chemicals as well as metabolites from our food consumption eventually find their way into surface waters and may impact downstream users of that water. Some components such as caffeine, pain killers (ibuprofen and acetaminophen) are often found immediately downstream of human wastewater sources. Measuring these compounds can therefore provide a means of measuring the impact of human activities on the receiving water. In considering various scientific studies, it appears that the risk to humans from the various metabolites of pharmaceuticals and other products that are excreted or disposed of in wastewater is very small. The main environmental risk seems to be associated with changes in the health of various organisms (e.g. fish) in the immediate vicinity of waste water discharges.

A survey for various pharmaceutical metabolites and personal care products was first carried out during 2009 in the Upper Qu'Appelle River and Buffalo Pound Lake to identify if any potential problem or concern exists. In that survey only cotinine, a metabolite of nicotine (found in tobacco and related plants) was found at levels of ten parts per trillion (0.00000001 grams per litre) which corresponds to the analytical detection limit.

The survey was repeated in 2010 during the wet spring weather (June 1st) when flows in the Upper Qu'Appelle River were mainly due to runoff within the watershed. Unlike 2009, several compounds associated with human use were detected within the Upper Qu'Appelle River samples. These included acesulfame, an artificial sweetener that is quite stable and poorly removed in waste water treatment, sulamethioxazole, an antibacterial and, somewhat disturbingly, cocaine and its metabolite benzoylecgonine. Acetaminophen was also found at one river sampling site. Cotinine which seems ubiquitous in this watershed was detected as before. All of these compounds were detected at exceedingly low levels (parts per trillion). Only acesulfame was detected in Buffalo Pound Lake water. The abnormally wet weather coupled with spring-time discharges of wastewater may be quite a rare event and not likely to compromise human health. However it does show that there are impacts of human use that can be tracked and emphasizes the importance of watershed practices that minimize those impacts.

WATERSHED MONITORING

Monitoring of the Upper Qu'Appelle River watershed including Buffalo Pound Lake is typically carried out on an annual basis. In 2010 watershed sampling was carried out on June 1st. Results of the monitoring for pharmaceuticals and halogens are discussed elsewhere. The results in 2010 are not typical due to the abnormally wet weather and low diversion rates of Lake Diefenbaker water via the Qu'Appelle Dam. Lake Diefenbaker water is of generally better quality than Buffalo Pound Lake water especially when local runoff within the watershed compromises a larger portion of Buffalo Pound Lake's inflow.

The long-term watershed data collected by the Buffalo Pound Water Administration Board staff represents a valuable resource for examining water quality trends or issues. Copies of this database are requested regularly by government agencies and water quality researchers. The data is provided freely as a public service and as a means of encouraging new research into limnology and water treatment. Diversions from Lake Diefenbaker via the Upper Qu'Appelle River and Buffalo Pound Lake will increase if irrigated agriculture and industries are developed in Southern Saskatchewan. The watershed data collected since 1979 will provide a baseline for assessing the impacts of these future developments.

FINANCIAL SUMMARY

The 2010 water rate for the cities of Regina and Moose Jaw increased by 5.5% from the 2009 rate to $204.75 per Megaliter. The electrical rate was set at $0.07278 per KWH for 2009, a 6.3% increase from 2009.

The cool weather in 2010 as well as the intermittent operation of the meat-packing plant in Moose Jaw resulted in a drop in sales from 2009 to 2010. Sales to Regina were 7.3% below plan; sales to Moose Jaw were 12.3% below plan. Combined city sales in 2010 were 8.2% below plan.

Sales to Regina dropped from 27,868 ML in 2008 to 27,556 ML in 2009 to 25,957 ML in 2010; sales to Moose Jaw dropped from 6,633 ML in 2008 to 5,996 ML in 2009 to 5,351 ML. Sales to Regina decreased 5.8% from 2009, and sales to Moose Jaw decreased 10.8%.

Operations at the Buffalo Pound Water Treatment Plant resulted in a surplus of approximately $516,782 in 2010.

Utilities costs were under plan in 2010. Due to the large decrease in treated water volumes electrical costs were below plan. Electrical revenues were also under plan due to reduced sales.

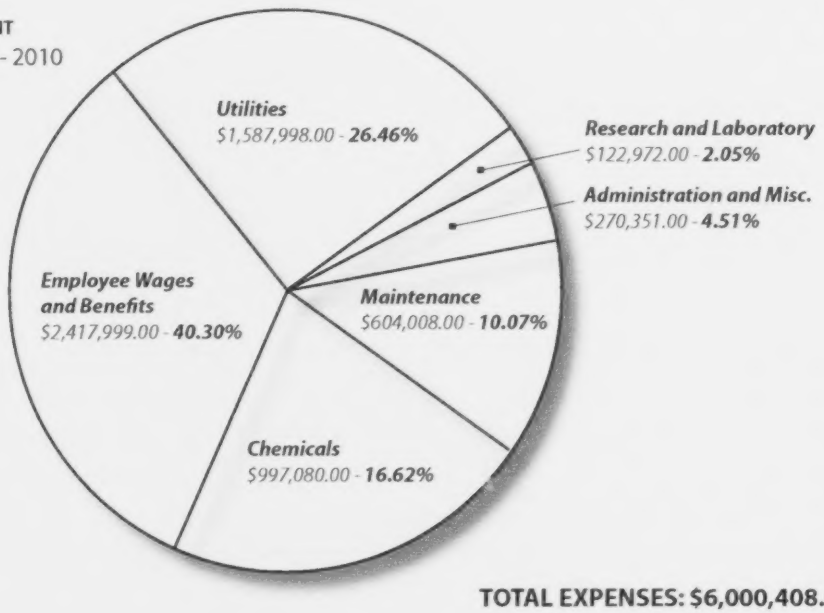
Chemicals costs were $627,920 under budget primarily due to raw water quality being much better than usual. Chlorine and alum dosages were significantly under plan; chlorine costs were $61,418 under budget, alum costs were $435,660 under budget. No powdered activated carbon was used so costs were $94,273 under budget. Granular activated carbon costs were $36,569 under plan due to the increased value of the Canadian dollar affecting the price paid for GAC.

Most maintenance accounts were also under budget. One account that was significantly under budget is Wastewater System Maintenance due to the amount of sludge lagoon management work unable to be completed.

Audited financial statements are contained in Appendix 2. Graph 4 summarizes expenses for 2010 as a percent of the total budget.

Graph 4

BUFFALO POUND WATER TREATMENT PLANT
SUMMARY OF OPERATING EXPENSES - 2010



TOTAL EXPENSES: $6,000,408.00

APPENDICES

Appendix 1: Water Quality Data – 2010

- ~ Drinking Water Quality and Compliance Report for 2010
- ~ Buffalo Pound Water Treatment Plant Laboratory
- ~ Organics Analysis – Saskatchewan Research Council
- ~ Metals Analysis - Saskatchewan Research Council
- ~ Organics Analysis – Alberta Research Council

Appendix 2: Audited Financial Statements – 2010

Water Quality Data - 2010

BUFFALO POUND WATER TREATMENT PLANT LABORATORY

Analytical Data - 2010

Moose Jaw / Regina, Saskatchewan
December 2010

BUFFALO POUND WATER TREATMENT PLAN

DRINKING WATER QUALITY AND COMPLIANCE REPORT FOR 2010

INTRODUCTION

Saskatchewan Environment requires each Permittee to monitor water quality as stipulated under its Permit to Operate a Waterworks. Permittees are also required to prepare an annual report to their customers and Saskatchewan Environment summarizing the analytical results of the monitoring in a report entitled ÒDrinking Water Quality and Compliance Report.Ó

For more information about the meaning and type of sample refer to Saskatchewan EnvironmentÕs ÒMunicipal Drinking Water Quality Monitoring Guidelines, November, 2002 EPB 202Óor the associated website www.saskh20.ca.

Wherever the Òless than signÓ(<) is used it means that the parameter was not detected at the level indicated.

WATER QUALITY STANDARDS – BACTERIOLOGICAL QUALITY

According to its Permit to Operate a Waterworks the Buffalo Pound Water Treatment Plant is required to analyze one sample every week from the treated water for Bacteriological Quality. On no occasion were any coliforms detected.

Parameter	Limit	Number of Samples Submitted	Number of Samples Exceeding Limit
Total Coliforms	0 per 100 ml	52	0
Background Organisms	<200 per 100 ml	52	0

WATER QUALITY STANDARDS – FILTER TURBIDITY

The Buffalo Pound Water Treatment Plant is required to monitor the effluent turbidity from all twelve filters on a Continuous Basis. The turbidity from each individual filter shall be less than 0.3 NTU, 95% of the time. The turbidity shall not exceed 0.3 NTU for more than 12 consecutive hours and shall never exceed 1.0 NTU. If, on those rare occasions when the monthly average of the source water turbidity is less than 1.5 NTU, the water turbidity levels from each filter must be less than 0.2 NTU, 95% of the time, the turbidity shall not exceed 0.2 NTU for more than 12 consecutive hours and shall never exceed 1.0 NTU.

This PlantÕs SCADA Control System automatically generates an alarm if a filter effluent turbidity exceeds 0.3 NTU. If the turbidity exceeds 0.4 NTU at any time, the PlantÕs SCADA Control System automatically closes the filter effluent valve, turning off the filter. The plantÕs operating permit requires on-line turbidity monitoring on the effluent of each of its twelve filters. A problem with the turbidity monitor or data transfer system to the plantÕs SCADA requires a shutdown of the affected filter. To address this possibility the plant has a second independent turbidimeter on each filter so that continuous monitoring can be maintained even if the first turbidimeter fails.

WATER QUALITY STANDARDS – FLUORIDE

The Buffalo Pound Water Treatment Plant adds fluoride to the water pumped to the City of Moose Jaw and is required to monitor the fluoride level in that water on a continuous basis. The Maximum Acceptable Concentration (MAC) is 1.5 mg/l. Alarms signal a high residual dose at 1.3 mg/L. The target treatment level is 0.7 mg/L reflecting Health Canada's new recommended dosage level. On Wednesday, March 10, 2010 an incident occurred when an abnormally high concentration of fluoride was added to the water in the Moose Jaw supply pipeline. The high concentration was added when an incorrect high reading from the Moose Jaw pipeline flow meter caused the fluoride feeder to inject more fluoride than required. The incident was immediately reported to Ministry of Environment officials and appropriate action was taken to ensure the no persons were subjected to an unacceptable concentration of fluoride. Other than the brief event on March 10 the maximum recorded level of fluoride via a laboratory analysis for water pumped to Moose Jaw was 0.91 mg/L. Fluoride was not added to the Moose Jaw supply from March 10 until the week of May 31 when the flow meter was repaired.

WATER QUALITY STANDARDS – CHLORINE RESIDUAL

To ensure adequate disinfection the Buffalo Pound Water Treatment Plant must monitor the chlorine residual of the treated water on a continuous basis and the free chlorine residual shall not be less than 0.1 milligrams per litre. The normal operating range for the free chlorine residual in the treated water is 0.9 to 1.1 mg/l. The SCADA control system will automatically shut off pumping to the Cities if the chlorine level is less than 0.5 mg/l. A high level chlorine alarm will alert the operator if chlorine levels in the clearwell exceed 1.3 mg/L.

WATER QUALITY STANDARDS – CHEMICAL – GENERAL

As part of the plant's "Permit to Operate" a general chemical analysis is required once in every three month period from the treated water. Only two of these parameters have an established Maximum Acceptable Concentration (MAC) limit. Eight others have an Aesthetic Objective (AO) which is desirable but has no impact on human health.

Parameter (mg/l) unless stated	Feb 08	May 10	Aug 09	Nov 08	Limit MAC or AO (*)	No. of Samples Exceeding MAC or AO
Alkalinity	162	135	86.1	124	500*	0
Bicarbonate	197	165	105	151		
Carbonate	ND	ND	ND	ND		
Chloride	18.07	14.5	21.26	23.64	250*	0
Conductivity (uS/cm)	596	517	540	681		
Fluoride	0.13	0.12	0.1	0.11	1.5	0
Hardness	220	188	159	200	800*	0
Calcium	50.3	44	32.9	42.7		
Magnesium	23.4	19.1	19.9	23.3	200*	0
Nitrate	0.50	ND	0.28	0.09	45	0
pH (pH units)	7.47	7.71	7.36	7.5	6.5 Ð8.5*	0
Sodium	42.3	35.4	49.1	71.6	300*	0
Sulphate	125.4	110	148.0	191.8	500*	0
Total Dissolved Solids	382	318	356	424	1500*	0

ND ÐNot Detected

WATER QUALITY STANDARDS – CHEMICAL – HEALTH

The Buffalo Pound Water Treatment Plant is required to sample the treated water for the following parameters once in every six month period.

Parameter (mg/l)	May 18	Nov 16	Limit MAC, IMAC* Operational Guideline** or AO***	Number of Samples Exceeding Limit
Aluminum	0.044	0.014	0.1**	0
Arsenic	0.0003	0.0003	0.025*	0
Barium	0.057	0.061	1.0	0
Boron	0.04	0.08	5.0*	0
Cadmium	<0.00001	<0.00001	0.005	0
Chromium	<0.0005	<0.0005	0.05	0
Copper	0.0005	0.0004	1.0***	0
Iron	0.0005	0.0007	0.3***	0
Lead	<0.0001	<0.0001	0.01	0
Manganese	<0.0005	<0.0005	0.05***	0
Selenium	0.0002	0.0003	0.01	0
Uranium	0.0007	0.0003	0.02*	0
Zinc	<0.0005	0.0015	5.0***	0

WATER QUALITY STANDARDS – PESTICIDES

Once per year the Buffalo Pound Water Treatment Plant is required to have the treated water analyzed for the following pesticides. Those noted on the permit are indicated below; the entire pesticide analysis is noted in the Appendix.

Parameter (mg/l)	Jan 19	Limit MAC or IMAC* or Operational Guideline**	Number of Samples Exceeding Limit
Atrazine	<0.000005	0.005*	0
Bromoxynil	<0.000005	0.005*	0
Carbofuran	<0.002	0.09	0
Chlorpyrifos	<0.000005	0.09	0
Dicamba	<0.000005	0.12	0
Dichlorophenoxyacetic Acid 2,4 (2,4-D)	0.000014	0.1*	0
Diclofop-methyl	<0.00002	0.009	0
Dichlorprop 2-4DP	<0.000005	N/A	0
Dimethoate	<0.00005	0.02*	0
Glyphosate	<0.0002	0.28**	0
Malathion	<0.00005	0.19	0
Picloram	<0.000005	0.19*	0
Trifluralin	<0.000005	0.045*	0
Ethalfluralin	<0.000005	N/A	0
MCPA	<0.000005	N/A	0
Pentachlorophenol	<0.0001	0.06	0
Triallate	<0.000005	N/A	0

WATER QUALITY STANDARDS – DISINFECTION BY-PRODUCT – TRIHALOMETHANES

As part of the plantÕs ÒPermit to OperateÓ an analysis for Trihalomethanes is required once per month from the treated water. The MAC is 0.1 milligrams per litre, or, 100 micrograms per litre (parts per billion) for total trihalomethanes on a running quarterly average. No samples exceeded this concentration.

Parameter (ug/l)	Jan 11	Feb 08	Mar 01	Apr 06	May 03	Jun 07
Chloroform	27	26	26	32	39	<1
Bromodichloromethane	10	9	11	11	11	<1
Dibromochloromethane	2	2	3	2	1	<1
Bromoform	<1	<1	<1	<1	<1	<1
Total Trihalomethanes	39	37	40	45	51	<1
	Jul 05	Aug 03	Sep 07	Oct 04	Nov 01	Dec 13
Chloroform	3	36	40	38	25	17
Bromodichloromethane	<1	3	9	14	12	12
Dibromochloromethane	<1	<1	1	2	2	6
Bromoform	<1	<1	<1	<1	<1	<1
Total Trihalomethanes	3	39	50	54	39	35

WATER QUALITY STANDARDS – DISINFECTION BY-PRODUCT – HALOACETIC ACIDS (HAA5'S)

The Buffalo Pound Water Treatment Plant is obligated to sample for Haloacetic Acids every three months. The results are as follows:

Parameter (ug/l)	Jan 19	Apr 19	Jul 06	Oct 05	Limit MAC	Number of Samples Exceeding Limit
HAA5	29	32	<5	<7.8	80	0

WATER QUALITY STANDARDS – CYANIDE AND MERCURY

The Buffalo Pound Water Treatment Plant is required to submit two (2) samples per year for analysis for Cyanide and Mercury.

Parameter (mg/l)	June 03	Nov 23	Limit MAC	Number of Samples Exceeding Limit
Cyanide	<0.0001	<0.0001	0.2	0
Mercury	<0.00001	<0.00001	0.001	0

WATER QUALITY STANDARDS – ORGANICS PLUS MICROCYSTIN

The Buffalo Pound Water Treatment Plant is required to submit one (1) sample per year for analysis for various organics including Microcystin. Those noted on the permit are indicated below; the entire organic analysis is noted in the Appendix.

Parameter (mg/l)	Jan 19	Limit MAC, IMAC*	Number of Samples Exceeding Limit
Benzene	<0.0001	0.005	0
Benzo(a)pyrene	<0.00001	0.00001	0
Carbon Tetrachloride	<0.0001	0.005	0
Dichlorobenzene 1,2	<0.0001	0.2	0
Dichlorobenzene 1,4	<0.0001	0.005	0
Dichoroethane 1,2	<0.0001	0.005*	0
Dichloroethylene 1,1	<0.0001	0.014	0
Dichloromethane	<0.002	0.005	0
Dichlorophenol 2,4	<0.00001	0.9	0
Ethylbenzene	<0.0001	0.0024	0
Monochlorobenzene	<0.0001	0.08	0
Toluene	<0.0001	0.024	0
Tetrachlorophenol 2,3,4,6	<0.0001	0.1	0
Trichloroethylene	<0.0001	0.05	0
Trichlorophenol 2,4,6	<0.0001	0.005	0
Vinyl Chloride	<0.0005	0.002	0
Xylenes	<0.0001	0.300	0
Microcystin	<0.0005 (Jul 28)	0.0015	0

2010 - BUFFALO POUND WATER QUALITY DATA
RAW LAKE WATER

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Parameters	Units	JAN Avg	FEB Avg	MAR Avg	APR Avg	MAY Avg	JUN Avg	JUL Avg	AUG Avg	SEP Avg	OCT Avg	NOV Avg	DEC Avg	YEAR AVG	YEAR MIN	YEAR MAX	Number of Tests
PHYSICAL																	
Colour (Apparent)	PtCo	10	10	10	25	20	15	25	50	35	15	20	15	21	10	50	12
Conductivity	µS/cm	564	585	581	505	508	496	483	514	559	651	673	732	571	483	732	12
Bench Diss. Oxygen	mg/L	8.5	7.2	5.3	10.2	10.5	9.4	7.3	8.6	10.2	11.2	12.0	10.6	9.2	4.2	14.4	50
Bench Diss. Oxygen	%	64.2	54.3	40.7	83.7	93.1	97.0	83.4	95.5	97.8	101.4	88.6	76.2	81.4	32.1	123.1	50
ON-LINE Diss. Oxygen	%	66.3	46.7	33.6	99.3	101.9	108.1	94.9		99.3	88.5	92.0	83.9	81.1	24.2	115.1	40
Odour	T.O.N.	15	13	18	80	86	130	158	207	85	47	36	21	76	10	267	50
pH	pH units	7.91	7.78	7.63	8.18	8.37	8.54	8.49	8.77	8.62	8.35	8.34	8.10	8.26	7.54	8.95	52
Temperature	¡ C	3.5	3.6	4.3	7.0	10.8	17.1	21.6	20.4	13.7	11.1	2.7	1.8	9.9	1.1	23.1	52
Turbidity	NTU	1.1	1.0	1.0	3.2	1.6	2.2	3.7	8.7	3.1	2.1	1.8	0.9	2.6	0.8	10.6	52
TDS	mg/L	370	378	368	312	312	344	308	332	360	412		454	359	308	454	11
TDS	mg/L(calc)	450	473	477	404	402	402	369	387	437	495	525	567	449	369	567	
Langelier Index (RTW)	pH units (calc)		0.12	-0.10		0.68	0.84	0.74	1.13	0.90	0.51	0.54	0.26	0.56	-0.10	1.13	
MAJOR CONSTITUENTS																	
Alkalinity(p)	mg/L CaCO3	<DL	<DL	<DL	<DL	<DL	4	4	10	3	<DL	<DL	<DL	2	<DL	10	24
Alkalinity(total)	mg/L CaCO3	185	190	192	163	159	153	139	130	140	151	161	172	161	129	192	24
Bicarbonate	mg/L	223	232	234	199	193	175	162	134	162	183	196	209	192	133	234	24
Carbonate	mg/L	<DL	<DL	<DL	<DL	<DL	5	4	12	4	1	<DL	<DL	2	<DL	12	23
Calcium	mg/L	48	50	52	45	45	45	36	34	36	40	43	47	43	34	52	12
Magnesium	mg/L	22	123	23	19	19	20	19	20	21	23	25	26	22	19	26	12
Hardness (total)	mg/L CaCO3	209	132	225	185	186	184	165	160	176	191	225	221	196	160	225	12
Sodium	mg/L	42	23	43	39	36	39	38	51	58	68	70	75	50	36	75	12
Potassium	mg/L	4.5	54.2	4.8	3.9	4.2	4.4	4.6	4.7	5.2	5.4	5.4	5.8	4.8	3.9	5.8	12
Sulphate	mg/L	100	59	103	86	89	91	94	114	132	153	164	177	117	86	177	12
Chloride	mg/L	13.8	14.5	14.6	12.1	12.0	12.2	12.6	15.7	17.8	20.1	21.0	22.8	15.8	12.0	22.8	12
TRACE CONSTITUENTS																	
Aluminum (dissolved 0.45µ)	ug/L	17	7	<DL	29	14	22	12	11	74	20	30	9	20	<DL	74	12
Ammonia N	mg/L N	0.21	0.25	0.11	<DL	0.07	<DL	0.06	0.10	0.05	0.05	0.06	0.09	0.09	<DL	0.25	12
BOD (5-day)	mg/L	1.8	1.8	0.9	5.0	2.5	2.2	3.3	6.7	1.5	2.1	5.2	3.0	3.0	0.9	6.7	12
Bromide	mg/L	<DL	<DL	<DL	<DL	<DL	<DL	<DL	0.06	0.06	0.07	0.08	0.09	<DL	<DL	0.09	12
Chlorophyll a	mg/L	10	5	3	20	4	6	31	62	28	11	11	8	17	3	62	12
Fluoride	mg/L	0.19	0.19	0.19	0.17	0.17	0.17	0.16	0.17	0.18	0.18	0.18	0.18	0.18	0.16	0.19	12
Iron (dissolved)	mg/L	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	12
Manganese (dissolved)	mg/L	0.03	0.13	0.24	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	0.01	0.03	<DL	0.24	12
Nitrate	mg/L	<DL	0.11	0.29	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	0.29	12
Organic N	mg/L N	<DL	0.41	0.37	0.54	0.39	0.41	0.68	0.82	0.75	0.67	0.48	0.44	0.53	0.37	0.82	12
Raw TOC	mg/L C (UV)	5.7	5.5	5.2	5.5	4.9	5.2	6.0	7.3	6.4	6.1	5.7	5.7	5.8	4.6	8.2	
Raw DOC (GF diss)	mg/L C (UV)	5.6	5.4	5.0	4.6	4.6	4.7	5.2	6.2	5.8	5.8	5.4	5.1	5.3	4.3	6.8	52
UV absorbance @ 254nm	Abs 10cm	0.880	0.884	0.869	0.778	0.871	0.841	0.926	1.024	1.036	0.999	0.955	0.972	0.920	0.717	1.059	52
SUVA	L / mg m	1.575	1.637	1.736	1.700	1.885	1.797	1.770	1.604	1.781	1.739	1.781	1.898	1.741	1.444	1.967	52
PreFM UV abs @ 254nm	Abs 10cm	0.744	0.775	0.739	0.639	0.693	0.673	0.713	0.806	0.833	0.824	0.793	0.806	0.753	0.576	0.915	52
Phosphate(ortho)	µg/L P	11	20	28	3	5	4	<DL	<DL	6	14	12	15	10	<DL	28	12
Phosphate(total)	µg/L P	33	42	48	59	35	34	70	78	70	54	53	43	51	33	78	12
Silica (SiO3)	mg/L	1.7	2.2	2.8	1.9	1.7	0.9	1.0	2.7	4.8	5.5	5.0	5.4	3.0	0.9	5.5	12
Sulphide	µg/L																0

Continued...

2010 - BUFFALO POUND WATER QUALITY DATA
RAW LAKE WATER

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Parameters	Units	JAN Avg	FEB Avg	MAR Avg	APR Avg	MAY Avg	JUN Avg	JUL Avg	AUG Avg	SEP Avg	OCT Avg	NOV Avg	DEC Avg	YEAR AVG	YEAR MIN	YEAR MAX	Number of Tests
TRACE CONSTITUENTS																	
PreFM																	
TTHM's (total)	µg/L(calc)	29	29	27	33	44	50	62	70	61	46	31	30	43	25	79	
Chloroform	µg/L	21	21	19	23	34	37	45	46	36	24	15	15	28	13	58	52
Bromodichloromethane	µg/L	7	6	6	8	10	11	15	20	19	16	10	10	11	6	22	52
Chlorodibromomethane	µg/L	2	2	2	2	1	2	3	5	6	7	5	5	3	1	7	52
Bromoform	µg/L	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	52
BIOLOGICAL																	
Blue Green Algae (x10^-3)	per litre	<DL	<DL	<DL	<DL	<DL	1236	2059	3811	1089	111	36	53	746	<DL	6122	52
Green Algae (x10^-3)	per litre	1436	547	747	2731	1628	1520	7397	3827	2019	983	1229	864	2058	278	11155	52
Diatoms (x10^-3)	per litre	<DL	28	102	553	50	113	231	267	78	50	80	39	134	<DL	1267	52
Flagellates (x10^-3)	per litre	130	17	22	383	144	929	1309	1267	255	489	204	122	452	<DL	3133	52
Crustaceans	per litre	<3	5	<3	<3	3	7	10	19	10	6	5	<3	6	<3	20	38
Nematodes (x10^-3)	per litre	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	51
Rotifers (x10^-3)	per litre	<DL	<DL	<DL	<DL	<DL	<DL	17	17	<DL	<DL	<DL	<DL	<DL	<DL	44	51
Other (x10^-3)	per litre	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	51
Total Green & B-G	per litre	1444	547	747	2745	1636	2756	9456	7638	3108	1094	1265	917	2378	1811	3822	
BACTERIOLOGICAL																	
Total Coliforms	per 100 ml	1	1	<DL	31	53	68	1150	3300	650	238	2	1	487	<DL	7500	52
Total Coliforms (background)	per 100 ml	87	33	22	303	550	1650	11450	20600	6200	2988	1044	295	3927	11	32500	52
Faecal Coliforms	per 100 ml	<DL	<DL	<DL	<DL	1	1	2	3	2	2	<DL	<DL	1	<DL	5	
Standard Plate Count	per 1 ml	15	9	15	64	54	156	643	807	393	117	66	171	213	6	1560	52
CHEMICAL DOSES																	
Alum	mg/L	45	45	41	48	43	42	58	74	68	64	60	68	55	40	75	51
Alum\Raw DOC	ratio	8.01	8.33	8.18	10.39	9.19	8.95	10.99	11.58	11.59	11.08	11.20	13.17	10.25	7.67	13.46	
Alum-DOC Stoich	ratio	0.65	0.68	0.66	0.84	0.75	0.73	0.89	0.94	0.94	0.90	0.91	1.07	0.83	0.62	1.09	
Chlorine-pre	mg/L	3.7	4.0	3.1	3.1	2.8	3.0	5.1	5.9	4.6	3.6	2.4	3.8	3.7	1.8	6.2	52
Chlorine-intermed	mg/L																0
Chlorine-post	mg/L	0.8	0.7	0.9	0.8	0.9	1.3	1.4	1.4	1.3	1.4	1.4	1.1	1.1	0.4	1.8	52
Plant Flow	MLD	80.3	82.5	85.2	80.8	90.3	96.4	106.3	102.0	84.8	95.3	90.8	78.3	89.7	56.0	134.0	
Qu'Appelle Dam Flow	cu m/s	2.0	2.0	1.1	5.4	6.7	1.2	3.3	4.5	1.6	1.8	1.8		2.8	0.6	8.5	
Fluoride (Set Point for MJ)	mg/L	0.68	0.65	0.65			0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.70	42
Powdered Carbon	mg/L																0
CPAC Train A	mg/L																0
CPAC Train B	mg/L																0
Total Chlorine dose	mg/L (Calc)	4.5	4.7	3.9	3.8	3.7	4.3	6.5	7.3	5.9	5.0	3.8	4.9	4.9	3.1	7.7	52
Date GAC's ON														20-May			1
Date GAC's OFF														06-Dec			1
Date Ice ON Lake														19-Nov			1
Date Ice OFF Lake														09-Apr			1
Date PAC ON																	0
Date PAC OFF																	0
																	0
Chlorine Residuals Exit Plant (week avg.)																	0
Free Chlorine	mg/L	1.09	1.10	1.06	1.08	1.08	1.07	1.07	1.08	1.09	1.07	1.09	1.13	1.08	1.02	1.24	52
Combined Chlorine	mg/L	0.32	0.32	0.30	0.29	0.20	0.06	0.09	0.11	0.13	0.14	0.19	0.31	0.20	<DL	0.33	52

2010 - BUFFALO POUND WATER QUALITY DATA
TREATED WATER

PAGE 3

Parameters	Units	JAN Avg	FEB Avg	MAR Avg	APR Avg	MAY Avg	JUN Avg	JUL Avg	AUG Avg	SEP Avg	OCT Avg	NOV Avg	DEC Avg	YEAR AVG	YEAR MIN	YEAR MAX	Number of Tests
PHYSICAL																	
Colour (Apparent)	Pt/Co	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	12
Conductivity	µS/cm	563	596	609	516	517	506	501	540	584	666	681	745	585	501	745	12
Diss. Oxygen	mg/L	11.2	10.9	13.2	11.9	10.3	8.6	8.4	8.2	9.7	11.5	12.1	13.5	10.7	8.2	13.5	13
% Sat. Diss. Oxygen	%	82.9	80.7	99.2	88.1	87.8	87.2	95.9	95.0	97.5	109.7	94.6	96.6	93.3	80.7	109.7	13
Odour(Dechlorinated)	T.O.N.	7	6	6	8	5	<1	1	2	1	2	3	5	4	<1	8	51
PreGAC Odour	T.O.N.					10	12	22	93	56	16	9		36	7	133	26
Odour Removal by Coagulation and Filtration	%	54.8%	55.4%	66.8%	89.8%	90.7%	90.8%	86.3%	52.6%	35.6%	67.5%	72.9%	75.2%	69.5%	<1	93.0%	50
Odour Removal Overall	%	54.8%	55.4%	66.8%	89.8%	94.1%	99.8%	99.3%	99.2%	98.5%	95.0%	91.8%	75.2%	84.9%	40.0%	100.0%	50
PreFM pH	pH units	7.67	7.55	7.52	7.94	8.15	8.31	7.98	8.27	8.26	8.09	8.15	7.80	7.98	7.44	8.52	52
Coagulation pH - Channel 1	pH units	7.14	7.17	7.14	7.18	7.30	7.35	7.06	6.91	7.02	7.08	7.18	7.06	7.13	6.89	7.42	52
Coagulation pH - Channel 2	pH units	7.17	7.14	7.15	7.19	7.30	7.36	7.08	6.93	7.05	7.10	7.19	7.08	7.15	6.90	7.42	52
Clearwell pH	pH units	7.46	7.44	7.44	7.47	7.66	7.71	7.50	7.36	7.48	7.44	7.44	7.24	7.47	7.19	7.75	52
Temperature	¡ C	3.1	3.3	3.8	6.6	10.9	16.9	22.0	21.1	13.8	11.1	2.7	1.4	9.8	0.5	24.3	52
Turbidity	NTU	0.10	0.10	0.09	0.08	0.07	0.09	0.10	0.10	0.09	0.10	0.07	0.08	0.09	0.07	0.12	52
Total Dissolved Solids	mg/L	356	382	372	318	318	346	316	356	366	418	410	468	369	316	468	12
Total Dissolved Solids	mg/L(calc)	441	463	473	395	393	397	367	383	428	487	510	557	441	367	557	
Turbidity Log Removal	(calc)	1.04	1.01	1.05	1.59	1.34	1.36	1.56	1.95	1.51	1.32	1.38	1.04	1.35	0.95	2.03	
Langelier Index (RTW)	pH units (calc)		-0.34	-0.32		-0.13	-0.02	-0.38	-0.59	-0.55	-0.40	-0.47	-0.69	-0.39	-0.69	-0.02	
MAJOR CONSTITUENTS																	
Alkalinity(p)	mg/L CaCO3	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	12
Alkalinity(total)	mg/L CaCO3	153	162	168	134	135	136	106	86	97	115	124	132	129	86	168	12
Bicarbonate	mg/L	184	197	205	163	165	165	130	105	118	140	151	161	157	105	205	12
Carbonate	mg/L	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	12
Calcium	mg/L	48	50	52	44	44	45	36	33	36	40	43	46	43	33	52	12
Magnesium	mg/L	22	23	23	19	19	20	19	20	21	23	19	26	21	19	26	12
Hardness (total)	mg/L CaCO3	206	220	226	185	188	182	166	159	173	191	200	222	193	159	226	12
Sodium	mg/L	42	42	43	39	35	38	38	49	57	68	72	77	50	35	77	12
Potassium	mg/L	4.5	4.3	4.8	4.0	4.2	4.3	4.6	4.8	5.2	5.4	5.3	5.7	4.8	4.0	5.7	12
Sulphate	mg/L	122	125	124	110	110	110	121	148	165	183	192	212	143	110	212	12
Chloride	mg/L	17.2	18.1	17.8	14.6	14.5	14.7	17.4	21.3	22.3	23.4	23.6	25.5	19.2	14.5	25.5	12
TRACE CONSTITUENTS																	
CLEAR WELL																	
Aluminum (dissolved 0.45µ)	µg/L Chart	30	27	16	14	24	28	23	18	11	15	13	39	21	11	39	12
Aluminum (total)	µg/L Chart	36	31	29	22	25	30	26	21	12	17	14	59	27	12	59	13
Aluminum (total 12 mo avg)	µg/L	54	44	38	38	37	39	39	39	39	39	29	27				0
Aluminum (particulate)	µg/L (Calc)	6	<DL	13	8	<DL	<DL	<DL	<DL	<DL	<DL	<DL	20	<DL	<DL	20	12
Mixed Media Filter A																	0
Aluminum (total)	µg/L	33	28	33	22	50	58	51	61	32	35	44	64	43	22	64	12
Mixed Media Filter L																	0
Aluminum (total)	µg/L	32	28	30	22	22	55	55	62	33	63	35	51	41	22	63	12
PREGAC																	0
Aluminum (dissolved)	µg/L						56	45	48	24	31	24		38	24	56	6
Aluminum (total)	µg/L Chart						62	63	50	34	44	40		51	34	70	7
																	13
Ammonia N	mg/L N	0.06	0.06	0.06	0.06	0.06	0.04	0.05	0.05	<DL	<DL	<DL	<DL	0.04	<DL	0.06	12
Bromide	mg/L	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	12
Fluoride	mg/L	0.13	0.13	0.14	0.12	0.12	0.13	0.11	0.10	0.11	0.11	0.11	0.10	0.12	0.10	0.14	12
Fluoride (MJ dose by ISE)	mg/L (wk avg)	0.84	0.57	0.71	0.12	0.12	0.72	0.62	0.66	0.58	0.60	0.69	0.60	0.60	0.11	0.91	43
Iron (dissolved)	mg/L	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	12
Iron (total)	mg/L	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	12
Manganese (dissolved)	mg/L	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	12
Manganese (total)	mg/L	<DL	<DL	0.01	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	0.01	12
Nitrate	mg/L N	<DL	0.11	0.28	<DL	<DL	<DL	<DL	0.06	<DL	<DL	<DL	<DL	0.06	<DL	0.28	12
Organic N	mg/L N	0.24	0.23	0.22	0.23	0.16	0.07	0.06	0.12	0.14	0.16	0.19	0.27	0.17	0.06	0.27	12
CW TOC	mg/L C	4.0	4.1	3.8	3.5	2.6	0.6	1.1	1.9	2.3	2.7	2.9	3.4	2.7	0.4	4.4	52
CW DOC (GF diss)	mg/L C	3.9	4.0	3.9	3.4	2.6	0.6	1.1	1.9	2.3	2.6	2.9	3.3	2.7	0.4	4.0	52
PreGAC DOC (GF diss)	mg/L C					3.5	3.5	3.4	3.9	3.8	3.9	3.6		3.7	3.2	4.3	28
DOC Removal by Coagulation & Filtration	% Removal	29.8%	26.4%	22.8%	25.8%	27.4%	24.9%	33.8%	38.1%	35.1%	32.9%	33.0%	35.0%	30.4%	19.1%	44.1%	52
DOC Removal by GAC Filtration	% Removal					89.2%	81.7%	68.2%	52.0%	38.4%	32.5%	20.6%		50.0%	16.3%	89.7%	28
Total DOC (% Removal)	% Removal	29.8%	26.4%	22.8%	25.8%	44.5%	86.2%	79.0%	70.3%	60.0%	54.7%	46.7%	35.0%	48.9%	19.1%	92.3%	52
CW Organic Carbon (diss @ 254nm)	Abs 10cm	0.503	0.511	0.504	0.426	0.340	0.025	0.068	0.139	0.197	0.230	0.307	0.459	0.304	0.006	0.526	52
PreGAC Organic Carbon (diss @ 254nm)	Abs 10cm					0.458	0.441	0.435	0.470	0.494	0.501	0.499		0.472	0.418	0.537	28
Conventional SUVA	L / mg m	1.284	1.287	1.305	1.252	1.344	1.256	1.253	1.207	1.309	1.300	1.389	1.374	1.296	1.089	1.478	52
CW SUVA	L / mg m	1.284	1.287	1.305	1.252	1.122	0.407	0.569	0.720	0.845	0.881	1.070	1.374	0.999	0.095	1.478	12
Phosphate(ortho)	µg/L P	3	2	<DL	<DL	<DL	4	<DL	<DL	7	3	6	<DL	2	<DL	7	12
Phosphate(total)	µg/L P	<DL	8	9	<DL	<DL	<DL	6	6	3	4	9	<DL	4	<DL	9	12
Silica (SiO3)	mg/L	1.6	2.1	2.7	1.8	1.5	0.9	1.2	2.4	4.4	5.2	4.8	5.0	2.8	0.9	5.2	12
Sulphide	µg/L																0

Continued...

2010 - BUFFALO POUND WATER QUALITY DATA
TREATED WATER

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Parameters	Units	JAN Avg	FEB Avg	MAR Avg	APR Avg	MAY Avg	JUN Avg	JUL Avg	AUG Avg	SEP Avg	OCT Avg	NOV Avg	DEC Avg	YEAR AVG	YEAR MIN	YEAR MAX	Number of Tests
TRACE CONSTITUENTS																	
CLEARWELL																	
TTHM's (total)	µg/L(calc)	37	37	37	40	51	1	14	46	51	49	37	38	39	1	54	
Chloroform	µg/L	25	25	25	28	29	<DL	14	41	39	33	21	19	25	<DL	45	52
Bromodichloromethane	µg/L	10	10	10	10	8	<DL	<DL	5	11	14	13	13	9	<DL	15	52
Chlorodibromomethane	µg/L	2	2	2	2	1	<DL	<DL	<DL	1	2	2	6	2	<DL	7	52
Bromoform	µg/L	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	52
CHANNEL																	
TTHM's (total)	µg/L(calc)	35	33	33	32	47	41	52	66	62	50	36	32	43	32	66	
Chloroform	µg/L	24	23	22	22	35	29	37	43	36	26	17	15	27	15	43	12
Bromodichloromethane	µg/L	9	8	9	8	10	10	13	18	20	17	13	11	12	8	20	12
Chlorodibromomethane	µg/L	2	2	2	2	2	2	2	5	6	7	6	6	4	2	7	12
Bromoform	µg/L	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	12
PreGAC																	
TTHM's (total)	µg/L(calc)					48	49	61	67	61	50	35		53	30	74	
Chloroform	µg/L					35	35	44	44	35	25	17		33	14	50	
Bromodichloromethane	µg/L					11	12	15	18	20	17	12		15	11	22	
Chlorodibromomethane	µg/L					2	2	3	5	7	7	6		5	2	7	
Bromoform	µg/L					<DL	<DL	<DL	<DL	<DL	<DL	<DL		<DL	<DL	<DL	
BIOLOGICAL																	
Blue Green Algae	per litre	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL		<DL	<DL	<DL	<DL	11
Green Algae	per litre	55555	44444	22222	33333	11111	<DL	11111	<DL	<DL	33333		<DL	19192	<DL	55555	11
Diatoms	per litre	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	11111		<DL	1010	<DL	11111	11
Flagellates	per litre	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL		<DL	<DL	<DL	<DL	11
Crustaceans	per litre	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2		<2	<2	<2	<2	11
Nematodes	per litre	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL		<DL	<DL	<DL	<DL	11
Rotifers	per litre	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL		<DL	<DL	<DL	<DL	11
Other	per litre	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL		<DL	<DL	<DL	<DL	11
BACTERIOLOGICAL																	
Total Coliforms	per 100 ml	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	52
Total Coliforms (background)	per 100 ml	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	1	52
Faecal Coliforms	per 100 ml																0
Standard Plate Count	per 1 mL	<DL	<DL	<DL	<DL	<DL	0.2	39.8	7.8	11.5	3.0	0.4	1.0	5.1	<DL	104.0	52

ALBERTA RESEARCH COUNCIL | ORGANICS ANALYSIS DATA SHEET | ARC SAMPLE NUMBER: T10-0101

Contact: MWWS Buffalo Pound Water Treatment Plant
SmpNo : ProjNo : GrpSmpNo :
StaNo : StaType:
Comment: Raw Water
Matrix :
SmpDate: 19-Jan-10 @ Samplers..ID1 :
EndDate: @ ..ID2 :

VOLATILE PRIORITY POLLUTANTS
METHOD: IE505 | TimeLines (days)
SCAN: VPP | from sample date
| Max Actual
Date Received : 20-Jan-10 by: SS - 1 --
Date Extracted: 3-Feb-10 by: SS 7 15 *
Date Analyzed : 4-Feb-10 by: SS 7 16 *
Raw DataFile : V0101

VMV_CODE	COMPOUND NAME	ug/L	flag	MDL	+\-
100651	1,1,1,2-Tetrachloroethane	0.0		.1	.1
95224	1,1,2,2-Tetrachloroethane	0.0		.1	.1
95214	1,1-Dichloroethane	0.0		.1	.1
100645	1,1-Dichloropropylene	0.0		.1	.1
100655	1,2,3-Trichloropropane	0.0		.1	.1
100656	1,2,4-Trimethylbenzene	0.0		.1	.1
100641	1,2-Dibromoethane	0.0		.1	.1
95215	1,2-Dichloroethane	0.0		.1	.1
100657	1,3,5-Trimethylbenzene	0.0		.1	.1
100644	1,3-Dichloropropane	0.0		.1	.1
100643	2,2-Dichloropropane	0.0		.1	.1
100638	2-Chlorotoluene	0.0		.1	.1
95200	Benzene	0.0		.1	.1
95201	Bromodichloromethane	.1	H	.1	.1
95203	Bromomethane	0.0		.1	.1
95205	Chlorobenzene	0.0		.1	.1
95208	Chloroform	.4	H	.1	.1
95209	Dibromochloromethane	0.0		.1	.1
95221	Ethyl benzene	0.0		.1	.1
100647	Isopropylbenzene	0.0		.1	.1
95222	Methylene chloride	0.0		2.0	.1
95223	Styrene	0.0		.1	.1
95225	Tetrachloroethylene	0.0		.3	.1
100654	Trichloroethylene	0.0		.1	.1
95232	Vinyl chloride	0.0		.5	.1
100642	cis-1,2-Dichloroethylene	0.0		.1	.1
95234	m,p-Xylene	0.0		.1	.1
100650	n-Propylbenzene	0.0		.1	.1
100648	p-Isopropyltoluene	0.0		.1	.1
100636	tert-Butylbenzene	0.0		.1	.1
95220	trans-1,3-Dichloropropylene	0.0		.3	.1
95227	1,1,1-Trichloroethane	0.0		.1	.1
95228	1,1,2-Trichloroethane	0.0		.1	.1
95216	1,1-Dichloroethylene	0.0		.1	.1
100652	1,2,3-Trichlorobenzene	0.0		.1	.1
100653	1,2,4-Trichlorobenzene	0.0		.1	.1
100640	1,2-Dibromo-3-chloropropane	0.0		.3	.1
95211	1,2-Dichlorobenzene	0.0		.1	.1
95218	1,2-Dichloropropane	0.0		.1	.1
95212	1,3-Dichlorobenzene	0.0		.1	.1
95213	1,4-Dichlorobenzene	0.0		.1	.1
95207	2-Chloroethoxyethylene	0.0		.4	.1
100639	4-Chlorotoluene	0.0		.1	.1
100634	Bromobenzene	0.0		.1	.1
95202	Bromoform	0.0		.5	.1
95204	Carbon tetrachloride	0.0		.1	.1
95206	Chloroethane	0.0		.1	.1
106204	Chloromethane	0.0		.5	.1
95210	Dibromomethane	0.0		.1	.1
100646	Hexachlorobutadiene	0.0		.3	.1
102608	MTBE	0.0		.1	.1
100649	Naphthalene	0.0		.1	.1
100397	TRIHALOMETHANES	.5	H	.1	.1
95226	Toluene	0.0		.1	.1
95229	Trichlorofluoromethane	0.0		.1	.1
100407	XYLENES	0.0		.1	.1
95219	cis-1,3-Dichloropropylene	0.0		.3	.1
100637	n-Butylbenzene	0.0		.1	.1
95233	o-Xylene	0.0		.1	.1
100635	sec-Butylbenzene	0.0		.1	.1
95217	trans-1,2-Dichloroethylene	0.0		.1	.1

Zero (0) values indicate that the analyte is not DETECTED. MDL - Method Detection Limit

flags B - This analyte is found in the blank as well as the sample. The blank value has been subtracted.
X - Estimated value. The target compound meets the identification criteria, but is less than the MDL.
H - Compound Detected Q - Qualifying ions present but failed the ion ratio limits.
M - This value is calculated by an alternate Raw DataFile.

* - asterik following the value for Actual days taken indicates the prescribed time for that event was exceeded.

** - the Date Sampled is unknown, therefore timeline calculations can not be performed.

Certified For: Yogesh Kumar
Date: 5-Feb-10
Contact Person: Grant Prill

Business Unit Manager
Environmental Monitoring
Alberta Innovates-Technology Futures
Bag 4000, Vegreville, Alberta
T9C 1T4 (780) 632-8455

mail to: MWWS Buffalo Pound Water Treatment Plant
attn: Dan Conrad
Box 1790
Regina, Sk S4P 3C8

ALBERTA RESEARCH COUNCIL | ORGANICS ANALYSIS DATA SHEET | ARC SAMPLE NUMBER: T10-0101

Contact: MWS Buffalo Pound Water Treatment Plant
SmpNo : ProjNo : GrpSmpNo :
StaNo : StaType:
Comment: Raw Water
Matrix :
SmpDate: 19-Jan-10 @ Samplers..ID1 :
EndDate: @ ..ID2 :

VOLATILE PRIORITY POLLUTANTS
METHOD: IE505 | TimeLines (days)
SCAN: VPP | from sample date

| Max | Actual
Date Received : 20-Jan-10 by: SS | - | 1 | --
Date Extracted: 3-Feb-10 by: SS | 7 | 15 | *
Date Analyzed : 4-Feb-10 by: SS | 7 | 16 | *
Raw DataFile : V0101

| ESTIMATED CONCENTRATION
TENTATIVELY IDENTIFIED COMPOUNDS // COMMENTS

No additional compounds reported

Laboratory's comments regarding this sample:

The following items regarding the sample were recorded. A Yes notation indicates a problem with the specified item.

Inappropriate Sample Container - No
Inappropriate Temperature - No
Inappropriate Headspace - No
Broken / Leaking Container - No

This sample was analyzed by GC/MS. An additional GC/FID scan may have been used for screening purposes and to assist with quantitative data analysis.
Estimated concentrations for tentively identified compounds are calculated assuming an equal response to internal standards.
* - asterik following the value for Actual days taken indicates the prescribed time for that event was exceeded.
** - the Date Sampled is unknown, therefore timeline calculations can not be performed.

Certified For: Yogesh Kumar
Date: 5-Feb-10
Contact Person: Grant Prill

Business Unit Manager
Environmental Monitoring
Alberta Innovates-Technology Futures
Bag 4000, Vegreville, Alberta
T9C 1T4 (780) 632-8455

mail to: MWS Buffalo Pound Water Treatment Plant
attn: Dan Conrad
Box 1790
Regina, Sk S4P 3C8

"results relate only to the item tested"
Please check the mailing information and inform the lab if changes are required.

ALBERTA RESEARCH COUNCIL | ORGANICS ANALYSIS DATA SHEET | ARC SAMPLE NUMBER: T10-0102

EXTRACTABLE PRIORITY POLLUTANTS

Contact: MWWS Buffalo Pound Water Treatment Plant
SmpNo : ProjNo : GrpSmpNo :
StaNo : StaType:
Comment: Raw Water
Matrix :
SmpDate: 19-Jan-10 @ Samplers..ID1 :
EndDate: @ ..ID2 :

METHOD: IE340 | TimeLines (days)
SCAN: EPP | from sample date

	Max	Actual
Date Received : 20-Jan-10 by: SS	-	1 --
Date Extracted: 27-Jan-10 by: drc	7	8 *
Date Analyzed : 1-Feb-10 by: drc	21	13 ok

Raw DataFile : E0102

VMV_CODE	COMPOUND NAME	ug/L	flag	MDL	+\-	VMV_CODE	COMPOUND NAME	ug/L	flag	MDL	+\-
100730	1,2,4-Trichlorobenzene	0.0		.1	.1	100734	1,2-Diphenylhydrazine	0.0		.1	.1
103632	2,3,4,6-Tetrachlorophenol	0.0		.1	.2	100708	2,4,6-Trichlorophenol	0.0		.1	.2
100700	2,4-Dichlorophenol	0.0		.1	.2	100701	2,4-Dimethylphenol	0.0		.2	.2
100703	2,4-Dinitrophenol	0.0		.1	.2	100732	2,4-Dinitrotoluene	0.0		.1	.1
100733	2,6-Dinitrotoluene	0.0		.1	.1	100725	2-Chloronaphthalene	0.0		.1	.1
100699	2-Chlorophenol	0.0		.2	.2	100702	2-Methyl-4,6-dinitrophenol	0.0		.1	.2
100704	2-Nitrophenol	0.0		.1	.2	100738	4-Bromophenyl phenyl ether	0.0		.1	.1
100698	4-Chloro-3-methylphenol	0.0		.1	.2	100742	4-Chlorophenyl phenyl ether	0.0		.1	.1
100705	4-Nitrophenol	0.0		.1	.2	100709	Acenaphthene	0.0		.1	.1
100710	Acenaphthylene	0.0		.1	.1	100711	Anthracene	0.0		.1	.1
100731	Benzidine	0.0		.2	.2	100712	Benzo(a)anthracene	0.0		.1	.1
100716	Benzo(a)pyrene	0.0		.1	.2	100713	Benzo(b)fluoranthene	0.0		.1	.1
100715	Benzo(ghi)perylene	0.0		.2	.1	100714	Benzo(k)fluoranthene	0.0		.1	.1
100739	Bis(2-chloroethoxy)methane	0.0		.1	.1	100740	Bis(2-chloroethyl)ether	0.0		.1	.1
100741	Bis(2-chloroisopropyl)ether	0.0		.1	.1	100748	Bis(2-ethylhexyl)phthalate	0.0		.1	.1
100743	Butylbenzylphthalate	0.0		.1	.1	100717	Chrysene	0.0		.1	.1
100744	Di-n-butylphthalate	0.0		.1	.1	100747	Di-n-octyl phthalate	0.0		.1	.1
100718	Dibenzo(ah)anthracene	0.0		.5	.1	100745	Diethyl phthalate	0.0		.1	.1
100746	Dimethyl phthalate	0.0		.1	.1	100719	Fluoranthene	0.0		.1	.1
100720	Fluorene	0.0		.1	.1	100726	Hexachlorobenzene	0.0		.1	.1
100727	Hexachlorobutadiene	0.0		.5	.1	100728	Hexachlorocyclopentadiene	0.0		.1	.1
100729	Hexachloroethane	0.0		.5	.1	100721	Indeno(1,2,3-cd)pyrene	0.0		.1	.1
100749	Isophorone	0.0		.1	.1	100737	N-Nitroso-di-n-propylamine	0.0		.2	.1
100736	N-Nitrosodiphenylamine	0.0		.1	.1	100722	Naphthalene	0.0		.1	.1
100735	Nitrobenzene	0.0		.1	.1	100706	Pentachlorophenol	0.0		.1	.2
100723	Phenanthrene	0.0		.1	.1	100707	Phenol	0.0		.1	.2
100724	Pyrene	0.0		.1	.1						

Zero (0) values indicate that the analyte is not DETECTED. MDL - Method Detection Limit

flags B - This analyte is found in the blank as well as the sample. The blank value has been subtracted.
X - Estimated value. The target compound meets the identification criteria, but is less than the MDL.
H - Compound Detected Q - Qualifying ions present but failed the ion ratio limits.
M - This value is calculated by an alternate Raw DataFile.

* - asterik following the value for Actual days taken indicates the prescribed time for that event was exceeded.

** - the Date Sampled is unknown, therefore timeline calculations can not be performed.

Certified For: Yogesh Kumar
Date: 5-Feb-10
Contact Person: Grant Prill

Business Unit Manager
Environmental Monitoring
Alberta Innovates-Technology Futures
Bag 4000, Vegreville, Alberta
T9C 1T4 (780) 632-8455

mail to: MWWS Buffalo Pound Water Treatment Plant
attn: Dan Conrad
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Regina, Sk S4P 3C8

"results relate only to the item tested"

Please check the mailing information and inform the lab if changes are required. page 1 of 2

ALBERTA RESEARCH COUNCIL | ORGANICS ANALYSIS DATA SHEET | ARC SAMPLE NUMBER: T10-0102

Contact: MWWS Buffalo Pound Water Treatment Plant
SmpNo : ProjNo : GrpSmpNo :
StaNo : StaType:
Comment: Raw Water
Matrix :
SmpDate: 19-Jan-10 @ Samplers..ID1 :
EndDate: @ ..ID2 :

EXTRACTABLE PRIORITY POLLUTANTS
METHOD: IE340 | TimeLines (days)
SCAN: EPP | from sample date

Max	Actual	
Date Received : 20-Jan-10 by: SS	-	1	--
Date Extracted: 27-Jan-10 by: drc	7	8	*
Date Analyzed : 1-Feb-10 by: drc	21	13	ok

Raw DataFile : E0102

TENTATIVELY IDENTIFIED COMPOUNDS // COMMENTS	ESTIMATED CONCENTRATION
No additional compounds reported	

Laboratory's comments regarding this sample:

The following items regarding the sample were recorded. A Yes notation indicates a problem with the specified item.

Inappropriate Sample Container - No
Inappropriate Temperature - No
Inappropriate Headspace - No
Broken / Leaking Container - No

This sample was analyzed by GC/MS. An additional GC/FID scan may have been used for screening purposes and to assist with quantitative data analysis.
Estimated concentrations for tentively identified compounds are calculated assuming an equal response to internal standards.
* - asterik following the value for Actual days taken indicates the prescribed time for that event was exceeded.
** - the Date Sampled is unknown, therefore timeline calculations can not be performed.

Certified For: Yogesh Kumar
Date: 5-Feb-10
Contact Person: Grant Prill

Business Unit Manager
Environmental Monitoring
Alberta Innovates-Technology Futures
Bag 4000, Vegreville, Alberta
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mail to: MWWS Buffalo Pound Water Treatment Plant
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Box 1790
Regina, Sk S4P 3C8

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ALBERTA RESEARCH COUNCIL | ORGANICS ANALYSIS DATA SHEET | ARC SAMPLE NUMBER: T10-0103

PESTICIDE ANALYSIS

Contact: MWWS Buffalo Pound Water Treatment Plant
SmpNo : ProjNo : GrpSmpNo :
StaNo : StaType:
Comment: Raw Water
Matrix :
SmpDate: 19-Jan-10 @ Samplers..ID1 :
EndDate: @ ..ID2 :

METHOD: EM443
SCAN: PESTE

TimeLines (days)		
from sample date	Max	Actual
Date Received : 20-Jan-10 by: SS	-	1 --
Date Extracted: 22-Jan-10 by: ARJ	10	3 ok
Date Analyzed : 26-Jan-10 by: ARJ	20	7 ok

Raw DataFile : p0103

VMV_CODE	COMPOUND NAME	ug/L	flag	MDL	+\-	VMV_CODE	COMPOUND NAME	ug/L	flag	MDL	+\-
100667	2,4-D	.010	H	.005	.002	100668	2,4-DB	0.000		.005	.002
100669	2,4-DP	0.000		.005	.002	99888	2,4-dichlorophenol	0.000		.010	.004
99887	4-chloro-2-methylphenol	0.000		.010	.004	97938	Aldicarb	0.000		.100	.020
102929	Aldrin	0.000		.005	.002	106769	Aminopyralid	0.000		.010	.003
100674	Atrazine	0.000		.005	.002	99897	Bentazon	0.000		.005	.002
100675	Bromacil	0.000		.030	.004	100676	Bromoxynil	0.000		.005	.002
100677	Carbathiin (Carboxin)	0.000		.100	.020	99889	Chlorothalonil	0.000		.005	.002
100684	Chlorpyrifos (Dursban)	0.000		.005	.002	99881	Clodinafop acid metabolite	0.000		.020	.004
99880	Clodinafop-propargyl	0.000		.040	.056	100688	Clopyralid (Lontrel)	0.000		.020	.004
100678	Cyanazine	0.000		.050	.008	102609	Desethyl atrazine	0.000		.050	.008
102610	Desisopropyl atrazine	0.000		.050	.008	100679	Diazinon	0.000		.005	.002
103639	Dicamba (Banvel)	0.000		.005	.002	100681	Diclofop-methyl (Hoe Grass)	0.000		.020	.004
102930	Dieldrin	0.000		.005	.002	102618	Dimethoate (Cygon)	0.000		.050	.007
100682	Disulfoton (Di-Syston)	0.000		.200	.050	100683	Diuron	0.000		.200	.250
100685	Ethalfluralin (Edge)	0.000		.005	.002	100686	Ethion	0.000		.100	.020
99898	Ethofumesate	0.000		.005	.002	102613	Fenoxaprop-P-ethyl	0.000		.040	.008
99894	Fluazifop	0.000		.010	.004	99895	Fluroxypyr	0.000		.010	.004
100687	Guthion	0.000		.200	.020	99892	Hexaconazole	0.000		.050	.008
102088	Imazamethabenz-methyl(Assert)	0.000		.050	.044	103141	Imazamox	0.000		.020	.002
102612	Imazethapyr	0.000		.020	.004	99890	Iprodione	0.000		.020	.004
99899	Linuron	0.000		.020	.004	100690	MCPA	0.000		.005	.002
100691	MCPB	0.000		.020	.004	100692	MCPP (Mecoprop)	0.000		.005	.002
100689	Malathion	0.000		.050	.008	99893	Metalaxyl-M	0.000		.010	.004
97934	Methomyl	0.000		.100	.020	102935	Metolachlor	0.000		.005	.002
103631	Metribuzin	0.000		.010	.004	74365	Napropamide	0.000		.020	.004
97933	Oxycarboxin	0.000		.050	.008	103630	Parathion	0.000		.010	.004
100694	Phorate (Thimet)	0.000		.005	.002	100693	Picloram (Tordon)	0.000		.005	.002

Zero (0) values indicate that the analyte is not DETECTED. MDL - Method Detection Limit

flags B - This analyte is found in the blank as well as the sample. The blank value has been subtracted.
X - Estimated value. The target compound meets the identification criteria, but is less than the MDL.
H - Compound Detected Q - Qualifying ions present but failed the ion ratio limits.
M - This value is calculated by an alternate Raw DataFile.

* - asterik following the value for Actual days taken indicates the prescribed time for that event was exceeded.

** - the Date Sampled is unknown, therefore timeline calculations can not be performed.

Certified For: Yogesh Kumar
Date: 29-Jan-10
Contact Person: Grant Prill

Business Unit Manager
Environmental Monitoring
Alberta Innovates-Technology Futures
Bag 4000, Vegreville, Alberta
T9C 1T4 (780) 632-8455

mail to: MWWS Buffalo Pound Water Treatment Plant
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Regina, Sk S4P 3C8

results relate only to the item tested

Please check the mailing information and inform the lab if changes are required. page 1 of 1

ALBERTA RESEARCH COUNCIL | ORGANICS ANALYSIS DATA SHEET | ARC SAMPLE NUMBER: T10-0103

PESTICIDE ANALYSIS

Contact: MWWS Buffalo Pound Water Treatment Plant
SmpNo : ProjNo : GrpSmpNo :
StaNo : StaType:
Comment: Raw Water
Matrix :
SmpDate: 19-Jan-10 @ Samplers..ID1 :
EndDate: @ ..ID2 :

METHOD: EM443 | TimeLines (days)
SCAN: PESTE | from sample date

	Max	Actual
Date Received : 20-Jan-10 by: SS	-	1
Date Extracted: 22-Jan-10 by: ARJ	10	3 ok
Date Analyzed : 26-Jan-10 by: ARJ	20	7 ok
Raw DataFile : p0103		

VMV_CODE	COMPOUND NAME	ug/L	flag	MDL	+\-	VMV_CODE	COMPOUND NAME	ug/L	flag	MDL	+\-
99891	Propiconazole	0.000		.050	.008	102614	Pyridaben	0.000		.020	.004
102611	Quinclorac	0.000		.005	.002	99896	Quizalofop	0.000		.030	.004
103824	Simazine	0.000		.010	.004	100695	Terbufos	0.000		.030	.004
74474	Thiamethoxam	0.000		.050	.008	100696	Triallate (Avadex BW)	0.000		.005	.002
103825	Triclopyr	0.000		.010	.004	100697	Trifluralin (Treflan)	0.000		.005	.002
97932	Vinclozolin	0.000		.010	.004	100670	alpha-BHC	0.000		.005	.002
100671	alpha-Endosulfan	0.000		.005	.002	100672	gamma-BHC (Lindane)	0.000		.005	.002
100673	p,p-Methoxychlor	0.000		.030	.004						

Zero (0) values indicate that the analyte is not DETECTED. MDL - Method Detection Limit

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X - Estimated value. The target compound meets the identification criteria, but is less than the MDL.
H - Compound Detected Q - Qualifying ions present but failed the ion ratio limits.
M - This value is calculated by an alternate Raw DataFile.

* - asterik following the value for Actual days taken indicates the prescribed time for that event was exceeded.

** - the Date Sampled is unknown, therefore timeline calculations can not be performed.

Certified For: Yogesh Kumar
Date: 29-Jan-10
Contact Person: Grant Prill

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ALBERTA RESEARCH COUNCIL | ORGANICS ANALYSIS DATA SHEET | ARC SAMPLE NUMBER: T10-0104

POLYCYCLIC AROMATIC HYDROCARBONS

Contact: MWWS Buffalo Pound Water Treatment Plant
SmpNo : ProjNo : GrpSmpNo :
StaNo : StaType:
Comment: Raw Water
Matrix :
SmpDate: 19-Jan-10 @ Samplers..ID1 :
EndDate: @ ..ID2 :

METHOD: - - -
SCAN: PAH

TimeLines (days)		
from sample date	Max	Actual
Date Received : 20-Jan-10 by: SS	-	1 --
Date Extracted: 25-Jan-10 by: rmr	11	6 ok
Date Analyzed : 25-Jan-10 by: rmr	21	6 ok

Raw DataFile : P0104

VMV_CODE	COMPOUND NAME	ug/L	MDL flag	VMV_CODE	COMPOUND NAME	ug/L	MDL flag
GC/MSD SIM DATA							
103142	3-Methylchloranthrene	0.00	.01	103143	7,12-Dimethylbenz(a)anthracen	0.00	.01
103144	Acenaphthene	0.00	.01	103145	Acenaphthylene	0.00	.01
103146	Acridine	0.00	.01	103147	Anthracene	0.00	.01
103148	Benzo(a)anthracene	0.00	.01	103149	Benzo(a)pyrene	0.00	.01
103150	Benzo(b,j,k)fluoranthene	0.00	.01	103151	Benzo(c)phenanthrene	0.00	.01
103152	Benzo(e)pyrene	0.00	.01	103153	Benzo(ghi)perylene	0.00	.01
103154	Chrysene	0.00	.01	103155	Dibenzo(a,h)pyrene	0.00	.01
103156	Dibenzo(a,i)pyrene	0.00	.01	103157	Dibenzo(a,l)pyrene	0.00	.01
103158	Dibenzo(ah)anthracene	0.00	.01	103159	Fluoranthene	0.00	.01
103160	Fluorene	0.00	.01	103161	Indeno(1,2,3-cd)pyrene	0.00	.01
103162	Naphthalene	0.00	.01	107132	Perylene	0.00	.01
103163	Phenanthrene	0.00	.01	103164	Pyrene	0.00	.01
103761	Retene	0.00	.01				

ARC Remarks:

Zero (0) values indicate that the analyte is not DETECTED. MDL - Method Detection Limit

flags B - This analyte is found in the blank as well as the sample. The blank value has been subtracted.
X - Estimated value. The target compound meets the identification criteria, but is less than the MDL.
H - Compound Detected Q - Qualifying ions present but failed the ion ratio limits.
M - This value is calculated by an alternate Raw DataFile.

* - asterik following the value for Actual days taken indicates the prescribed time for that event was exceeded.

** - the Date Sampled is unknown, therefore timeline calculations can not be performed.

Certified For: Yogesh Kumar
Date: 28-Jan-10
Contact Person: Grant Prill

Business Unit Manager
Environmental Monitoring
Alberta Innovates-Technology Futures
Bag 4000, Vegreville, Alberta
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mail to: MWWS Buffalo Pound Water Treatment Plant
attn: Dan Conrad
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Regina, Sk S4P 3C8

"results relate only to the item tested"

Please check the mailing information and inform the lab if changes are required. page 1 of 1

ALBERTA RESEARCH COUNCIL | ORGANICS ANALYSIS DATA SHEET | ARC SAMPLE NUMBER: T10-0105

GLYPHOSATE, AMPA AND GLUFOSINATE

Contact: MWWS Buffalo Pound Water Treatment Plant
SmpNo : ProjNo : GrpSmpNo :
StaNo : StaType:
Comment: Raw Water
Matrix :
SmpDate: 19-Jan-10 @ Samplers..ID1 :
EndDate: @ ..ID2 :

METHOD: EC/16 | SCAN: GLYPH |

TimeLines (days)	from sample date	Max	Actual
Date Received : 20-Jan-10 by: SS		-	1 --
Date Extracted: 2-Feb-10 by: AJ		10	14 *
Date Analyzed : 23-Feb-10 by: DAH		60	35 ok

Raw DataFile : g0105

VMV_CODE	COMPOUND NAME	ug/L	flag	MDL	+\-
103453	Aminomethyl Phosphonic Acid	0.000		1.000	
103452	Glyphosate	0.000		.200	
103626	Glufosinate	0.000		1.000	

Zero (0) values indicate that the analyte is not DETECTED. MDL - Method Detection Limit

flags B - This analyte is found in the blank as well as the sample. The blank value has been subtracted.
X - Estimated value. The target compound meets the identification criteria, but is less than the MDL.
H - Compound Detected Q - Qualifying ions present but failed the ion ratio limits.
M - This value is calculated by an alternate Raw DataFile.

* - asterik following the value for Actual days taken indicates the prescribed time for that event was exceeded.

** - the Date Sampled is unknown, therefore timeline calculations can not be performed.

Certified For: Yogesh Kumar
Date: 24-Feb-10
Contact Person: Grant Prill

Business Unit Manager
Environmental Monitoring
Alberta Innovates-Technology Futures
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mail to: MWWS Buffalo Pound Water Treatment Plant
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"results relate only to the item tested"

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SRC Group # 2010-542

SRC ANALYTICAL

Feb 17, 2010

422 Downey Road
Saskatoon, Saskatchewan, Canada
S7N 4N1
(306) 933-6932 or 1-800-240-8808
Fax: (306) 933-7922

Buffalo Pound Water Admin. Board
P.O. Box 1790
2476 Victoria Avenue
Regina, Saskatchewan S4P 3C8
Attn: Dan Conrad

Sample # **2315**
Date Sampled: **Jan 19, 2010 07:25**
Sample Matrix: **WATER**
Description: **RAW WATER**

Client PO #: **16385**
Date Received: **Jan 20, 2010**

Analyte	Units	Result	DL
Organic Chemistry			
Carbaryl	ug/L	<0.1	0.1
Carbofuran	ug/L	<2	2

"<": not detected at level stated above.

SRC Group # 2010-542

SRC ANALYTICAL

Feb 17, 2010

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Saskatoon, Saskatchewan, Canada
S7N 4N1
(306) 933-6932 or 1-800-240-8808
Fax: (306) 933-7922

Buffalo Pound Water Admin. Board
P.O. Box 1790
2476 Victoria Avenue
Regina, Saskatchewan S4P 3C8
Attn: Dan Conrad

Sample # **2315**
Date Sampled: **Jan 19, 2010 07:25**
Sample Matrix: **WATER**
Description: **RAW WATER**

Client PO #: **16385**
Date Received: **Jan 20, 2010**

Analyte	Units	Result	DL
Organic Chemistry			
Carbaryl	ug/L	<0.1	0.1
Carbofuran	ug/L	<2	2

"<": not detected at level stated above.

SRC Group # 2010-4220

SRC ANALYTICAL

May 27, 2010

422 Downey Road
Saskatoon, Saskatchewan, Canada
S7N 4N1
(306) 933-6932 or 1-800-240-8808
Fax: (306) 933-7922

Buffalo Pound Water Admin. Board
P.O. Box 1790
2476 Victoria Avenue
Regina, Saskatchewan S4P 3C8
Attn: Dan Conrad

Sample # **15210**
Date Sampled: **May 18, 2010**
Sample Matrix: **WATER**
Description: **RAW WATER**

Client PO #: **16385**
Date Received: **May 20, 2010**

Analyte	Units	Result	DL
Inorganic Chemistry			
Total Cyanide (S.A.D.)	ug/L	<1	1
ICP			
Aluminum	mg/L	0.027	0.0005
Antimony	mg/L	<0.0002	0.0002
Arsenic	ug/L	1.2	0.1
Barium	mg/L	0.061	0.0005
Beryllium	mg/L	<0.0001	0.0001
Boron	mg/L	0.04	0.01
Cadmium	mg/L	<0.00001	0.00001
Chromium	mg/L	<0.0005	0.0005
Cobalt	mg/L	<0.0001	0.0001
Copper	mg/L	0.0008	0.0002
Iron	mg/L	0.019	0.0005
Lead	mg/L	<0.0001	0.0001
Manganese	mg/L	0.013	0.0005
Mercury	ug/L	<0.01	0.01
Molybdenum	mg/L	0.0014	0.0001
Nickel	mg/L	0.0012	0.0001
Selenium	mg/L	0.0002	0.0001
Silver	mg/L	<0.00001	0.00001
Strontium	mg/L	0.27	0.0005
Thallium	mg/L	<0.0002	0.0002
Tin	mg/L	<0.0001	0.0001
Titanium	mg/L	0.0004	0.0002
Uranium	ug/L	1.3	0.1
Vanadium	mg/L	0.0005	0.0001
Zinc	mg/L	0.0088	0.0005

"<": not detected at level stated above.

SRC Group # 2010-10839

SRC ANALYTICAL

Nov 26, 2010

422 Downey Road
Saskatoon, Saskatchewan, Canada
S7N 4N1
(306) 933-6932 or 1-800-240-8808
Fax: (306) 933-7922

Buffalo Pound Water Admin. Board
P.O. Box 1790
2476 Victoria Avenue
Regina, Saskatchewan S4P 3C8
Attn: Dan Conrad

Sample # **44385**
Date Sampled: **Nov 16, 2010**
Sample Matrix: **WATER**
Description: **RAW WATER**

Client PO #: **16385**
Date Received: **Nov 18, 2010**

Analyte	Units	Result	DL
Inorganic Chemistry			
Total Cyanide (S.A.D.)	ug/L	<1	1
ICP			
Aluminum	mg/L	0.010	0.0005
Arsenic	ug/L	1.7	0.1
Barium	mg/L	0.070	0.0005
Boron	mg/L	0.08	0.01
Cadmium	mg/L	0.00001	0.00001
Chromium	mg/L	<0.0005	0.0005
Copper	mg/L	0.0008	0.0002
Iron	mg/L	0.016	0.0005
Lead	mg/L	<0.0001	0.0001
Manganese	mg/L	0.0069	0.0005
Mercury	ug/L	<0.01	0.01
Selenium	mg/L	0.0002	0.0001
Uranium	ug/L	1.2	0.1
Zinc	mg/L	0.014	0.0005

"<": not detected at level stated above.

SRC ANALYTICAL

Buffalo Pound Water Admin. Board

Sample # **44386**
Date Sampled: **Nov 16, 2010**
Sample Matrix: **WATER**
Description: **RODI**

Client PO #: **16385**
Date Received: **Nov 18, 2010**

Analyte	Units	Result	DL
ICP			
Aluminum	mg/L	<0.005	0.005
Barium	mg/L	<0.001	0.001
Beryllium	mg/L	<0.001	0.001
Boron	mg/L	<0.002	0.002
Cadmium	mg/L	<0.001	0.001
Chromium	mg/L	<0.001	0.001
Cobalt	mg/L	<0.001	0.001
Copper	mg/L	<0.001	0.001
Iron	mg/L	<0.001	0.001
Lead	mg/L	<0.002	0.002
Manganese	mg/L	<0.001	0.001
Molybdenum	mg/L	<0.001	0.001
Nickel	mg/L	<0.001	0.001
Phosphorus	mg/L	<0.01	0.01
Silicon, soluble	mg/L	<0.01	0.01
Silver	mg/L	<0.001	0.001
Strontium	mg/L	<0.001	0.001
Titanium	mg/L	<0.001	0.001
Vanadium	mg/L	<0.001	0.001
Zinc	mg/L	<0.005	0.005
Zirconium	mg/L	<0.001	0.001

"<": not detected at level stated above.

SRC Group # 2010-4219

SRC ANALYTICAL

May 27, 2010

422 Downey Road
Saskatoon, Saskatchewan, Canada
S7N 4N1
(306) 933-6932 or 1-800-240-8808
Fax: (306) 933-7922

Buffalo Pound Water Admin. Board
P.O. Box 1790
2476 Victoria Avenue
Regina, Saskatchewan S4P 3C8
Attn: Dan Conrad

Sample # **15211** Client PO #: **16385**
Date Sampled: **May 18, 2010** Date Received: **May 20, 2010**
Sample Matrix: **WATER**
Description: **SK05JG0017 BUFFALO POUND WATER-CLEARWELL**

Analyte	Units	Result	DL
Inorganic Chemistry			
Total Cyanide (S.A.D.)	ug/L	<1	1
ICP			
Aluminum	mg/L	0.044	0.0005
Antimony	mg/L	<0.0002	0.0002
Arsenic	ug/L	0.3	0.1
Barium	mg/L	0.057	0.0005
Beryllium	mg/L	<0.0001	0.0001
Boron	mg/L	0.04	0.01
Cadmium	mg/L	<0.00001	0.00001
Chromium	mg/L	<0.0005	0.0005
Cobalt	mg/L	<0.0001	0.0001
Copper	mg/L	0.0005	0.0002
Iron	mg/L	0.0005	0.0005
Lead	mg/L	<0.0001	0.0001
Manganese	mg/L	<0.0005	0.0005
Mercury	ug/L	<0.01	0.01
Molybdenum	mg/L	0.0014	0.0001
Nickel	mg/L	0.0009	0.0001
Selenium	mg/L	0.0002	0.0001
Silver	mg/L	<0.00001	0.00001
Strontium	mg/L	0.27	0.0005
Thallium	mg/L	<0.0002	0.0002
Tin	mg/L	<0.0001	0.0001
Titanium	mg/L	<0.0002	0.0002
Uranium	ug/L	0.7	0.1
Vanadium	mg/L	0.0004	0.0001
Zinc	mg/L	<0.0005	0.0005

"<": not detected at level stated above.

SRC Group # 2010-10838

SRC ANALYTICAL

Nov 26, 2010

422 Downey Road
Saskatoon, Saskatchewan, Canada
S7N 4N1
(306) 933-6932 or 1-800-240-8808
Fax: (306) 933-7922

Buffalo Pound Water Admin. Board
P.O. Box 1790
2476 Victoria Avenue
Regina, Saskatchewan S4P 3C8
Attn: Dan Conrad

Sample # **44380** Client PO #: **16385**
Date Sampled: **Nov 16, 2010** Date Received: **Nov 18, 2010**
Sample Matrix: **WATER**
Description: **SK05JG0017 BUFFALO POUND WATER - CLEARWELL**

Analyte	Units	Result	DL
Inorganic Chemistry			
Total Cyanide (S.A.D.)	ug/L	<1	1
ICP			
Aluminum	mg/L	0.014	0.0005
Arsenic	ug/L	0.3	0.1
Barium	mg/L	0.061	0.0005
Boron	mg/L	0.08	0.01
Cadmium	mg/L	<0.00001	0.00001
Chromium	mg/L	<0.0005	0.0005
Copper	mg/L	0.0004	0.0002
Iron	mg/L	0.0007	0.0005
Lead	mg/L	<0.0001	0.0001
Manganese	mg/L	<0.0005	0.0005
Mercury	ug/L	<0.01	0.01
Selenium	mg/L	0.0003	0.0001
Uranium	ug/L	0.3	0.1
Zinc	mg/L	0.0015	0.0005

"<": not detected at level stated above.

SRC Group # 2010-543

SRC ANALYTICAL

Feb 17, 2010

422 Downey Road
Saskatoon, Saskatchewan, Canada
S7N 4N1
(306) 933-6932 or 1-800-240-8808
Fax: (306) 933-7922

Buffalo Pound Water Admin. Board
P.O. Box 1790
2476 Victoria Avenue
Regina, Saskatchewan S4P 3C8
Attn: Dan Conrad

Sample # **2314**
Date Sampled: **Jan 19, 2010 07:25**
Sample Matrix: **WATER**
Description: **CLEARWELL**

Client PO #: **16385**
Date Received: **Jan 20, 2010**

Analyte	Units	Result	DL
Organic Chemistry			
Monochloroacetic acid	ug/L	<5	5
Monobromoacetic acid	ug/L	3	1
Dichloroacetic acid	ug/L	11	0.5
Trichloroacetic acid	ug/L	12	1
Dibromoacetic acid	ug/L	3	0.5
Halo Acetic Acids 5, Total (calc.)	ug/L	29	5
Bromochloroacetic acid	ug/L	5	0.5
Carbaryl	ug/L	<0.1	0.1
Carbofuran	ug/L	<2	2

"<": not detected at level stated above.

SRC Group # 2010-3148

SRC ANALYTICAL

Apr 29, 2010

422 Downey Road
Saskatoon, Saskatchewan, Canada
S7N 4N1
(306) 933-6932 or 1-800-240-8808
Fax: (306) 933-7922

Buffalo Pound Water Admin. Board
P.O. Box 1790
2476 Victoria Avenue
Regina, Saskatchewan S4P 3C8
Attn: Dan Conrad

Sample # **11616**
Date Sampled: **Apr 19, 2010 08:57**
Sample Matrix: **WATER**
Description: **CLEARWELL**

Client PO #: **16385**
Date Received: **Apr 20, 2010**

Analyte	Units	Result	DL
Organic Chemistry			
Monochloroacetic acid	ug/L	<5	5
Monobromoacetic acid	ug/L	3	1
Dichloroacetic acid	ug/L	14	0.5
Trichloroacetic acid	ug/L	11	1
Dibromoacetic acid	ug/L	4	0.5
Halo Acetic Acids 5, Total (calc.)	ug/L	32	5
Bromochloroacetic acid	ug/L	5	0.5

"<": not detected at level stated above.

SRC Group # 2010-5910

SRC ANALYTICAL

Jul 19, 2010

422 Downey Road
Saskatoon, Saskatchewan, Canada
S7N 4N1
(306) 933-6932 or 1-800-240-8808
Fax: (306) 933-7922

Buffalo Pound Water Admin. Board
P.O. Box 1790
2476 Victoria Avenue
Regina, Saskatchewan S4P 3C8
Attn: Dan Conrad

Sample # **20909**
Date Sampled: **Jul 06, 2010 08:40**
Sample Matrix: **WATER**
Description: **CLEARWELL**

Client PO #: **16385**
Date Received: **Jul 07, 2010**

Analyte	Units	Result	DL
Organic Chemistry			
Monochloroacetic acid	ug/L	<5	5
Monobromoacetic acid	ug/L	<1	1
Dichloroacetic acid	ug/L	<0.5	0.5
Trichloroacetic acid	ug/L	1	1
Dibromoacetic acid	ug/L	2.7	0.5
Halo Acetic Acids 5, Total (calc.)	ug/L	<5	5
Bromochloroacetic acid	ug/L	2	0.5

"<": not detected at level stated above.

SRC Group # 2010-9385

SRC ANALYTICAL

Oct 19, 2010

422 Downey Road
Saskatoon, Saskatchewan, Canada
S7N 4N1
(306) 933-6932 or 1-800-240-8808
Fax: (306) 933-7922

Buffalo Pound Water Admin. Board
P.O. Box 1790
2476 Victoria Avenue
Regina, Saskatchewan S4P 3C8
Attn: Dan Conrad

Sample # **35101**
Date Sampled: **Oct 05, 2010 10:30**
Sample Matrix: **WATER**
Description: **CLEARWELL**

Client PO #: **16385**
Date Received: **Oct 06, 2010**

Analyte	Units	Result	DL
Organic Chemistry			
Monochloroacetic acid	ug/L	<5	5
Monobromoacetic acid	ug/L	1.8	1
Dichloroacetic acid	ug/L	<0.5	0.5
Trichloroacetic acid	ug/L	2.7	1
Dibromoacetic acid	ug/L	3.6	0.5
Halo Acetic Acids 5, Total (calc.)	ug/L	7.8	5
Bromochloroacetic acid	ug/L	3	0.5

"<": not detected at level stated above.

EPCOR

QUALITY ASSURANCE LABORATORY ANALYTICAL REPORT

Mail:
6th Floor, Capital Square
10065 Jasper Avenue
Edmonton, Alberta
T5J 3B1

Location:
Water Laboratory
Rossdale Water Treatment Plant
9459 Rossdale Road
Edmonton, Alberta
T5K 0A5

Tel: (780) 412-7614
Fax: (780) 412-7717

Submission: 2010-07-29-005 **Date Logged:** 29-Jul-2010 09:33

Results To: DAN CONRAD **Sample Condition:** See Notes Below

Address: BUFFALO POUND **Tel:** (306) 694-1377x3
PO BOX 1780 **Fax:** (306) 694-6050
REGINA, SK **Customer PO:** 16599
S4P 3C8 **Project ID:** BUFFALO POUND DBP
Receiving Temp (Deg Cel): 17

Report ID: VRS CRCBS6 04-Aug-2010 14:46

Sample Id	Sample Date	Client ID	Location	Sample Point	Method	Test	Result	Units	Entry Date	Analyst	MDL
BA37111	**Sample Condition:** COLD,SAMPLE INTACT, DOCUMENTED				**Sample Notes:**						
BA37111	28-Jul-2010 11:00			RAW WATER	106151	Microcystin	<0.5	ug/L	29-Jul-10	SLU	0.5
BA37112	**Sample Condition:** COLD,SAMPLE INTACT, DOCUMENTED				**Sample Notes:**						
BA37112	28-Jul-2010 11:30			CLEARWELL	106151	Microcystin	<0.5	ug/L	29-Jul-10	SLU	0.5

Other Services:

The results relate only to the samples tested. This report should not be reproduced except in full, without written approval of the laboratory.

Notes:

REPORT DATE: 05-Aug-2010 CERTIFIED BY: JHPara
John Paran / Lab Supervisor

ALBERTA RESEARCH COUNCIL | ORGANICS ANALYSIS DATA SHEET | ARC SAMPLE NUMBER: T10-0106

VOLATILE PRIORITY POLLUTANTS

Contact: MWWS Buffalo Pound Water Treatment Plant
SmpNo : ProjNo : GrpSmpNo :
StaNo : SK05JG0017 StaType:
Comment: Clear Well
Matrix : 9
SmpDate: 19-Jan-10 @ 0750 Samplers..ID1 :
EndDate: @ ..ID2 :

METHOD: IE505
SCAN: VPP

	TimeLines (days) from sample date	
	Max	Actual
Date Received : 20-Jan-10 by: SS	-	1 --
Date Extracted: 3-Feb-10 by: SS	7	15 *
Date Analyzed : 4-Feb-10 by: SS	7	16 *
Raw DataFile : V0106		

VMV_CODE	COMPOUND NAME	ug/L	flag	MDL	+\-	VMV_CODE	COMPOUND NAME	ug/L	flag	MDL	+\-
100651	1,1,1,2-Tetrachloroethane	0.0		.1	.1	95227	1,1,1-Trichloroethane	0.0		.1	.1
95224	1,1,2,2-Tetrachloroethane	0.0		.1	.1	95228	1,1,2-Trichloroethane	0.0		.1	.1
95214	1,1-Dichloroethane	0.0		.1	.1	95216	1,1-Dichloroethylene	0.0		.1	.1
100645	1,1-Dichloropropylene	0.0		.1	.1	100652	1,2,3-Trichlorobenzene	0.0		.1	.1
100655	1,2,3-Trichloropropane	0.0		.1	.1	100653	1,2,4-Trichlorobenzene	0.0		.1	.1
100656	1,2,4-Trimethylbenzene	0.0		.1	.1	100640	1,2-Dibromo-3-chloropropane	0.0		.3	.1
100641	1,2-Dibromoethane	0.0		.1	.1	95211	1,2-Dichlorobenzene	0.0		.1	.1
95215	1,2-Dichloroethane	0.0		.1	.1	95218	1,2-Dichloropropane	0.0		.1	.1
100657	1,3,5-Trimethylbenzene	0.0		.1	.1	95212	1,3-Dichlorobenzene	0.0		.1	.1
100644	1,3-Dichloropropane	0.0		.1	.1	95213	1,4-Dichlorobenzene	0.0		.1	.1
100643	2,2-Dichloropropane	0.0		.1	.1	95207	2-Chloroethoxyethylene	0.0		.4	.1
100638	2-Chlorotoluene	0.0		.1	.1	100639	4-Chlorotoluene	0.0		.1	.1
95200	Benzene	0.0		.1	.1	100634	Bromobenzene	0.0		.1	.1
95201	Bromodichloromethane	10.2	H	.1	.2	95202	Bromoform	0.0		.5	.1
95203	Bromomethane	0.0		.1	.1	95204	Carbon tetrachloride	0.0		.1	.1
95205	Chlorobenzene	0.0		.1	.1	95206	Chloroethane	0.0		.1	.1
95208	Chloroform	29.4	H	.1	.2	106204	Chloromethane	0.0		.5	.1
95209	Dibromochloromethane	2.4	H	.1	.2	95210	Dibromomethane	0.0		.1	.1
95221	Ethyl benzene	0.0		.1	.1	100646	Hexachlorobutadiene	0.0		.3	.1
100647	Isopropylbenzene	0.0		.1	.1	102608	MTBE	0.0		.1	.1
95222	Methylene chloride	0.0		2.0	.1	100649	Naphthalene	0.0		.1	.1
95223	Styrene	0.0		.1	.1	100397	TRIHALOMETHANES	42.0	H	.1	.2
95225	Tetrachloroethylene	0.0		.3	.1	95226	Toluene	0.0		.1	.1
100654	Trichloroethylene	0.0		.1	.1	95229	Trichlorofluoromethane	0.0		.1	.1
95232	Vinyl chloride	0.0		.5	.1	100407	XYLENES	0.0		.1	.1
100642	cis-1,2-Dichloroethylene	0.0		.1	.1	95219	cis-1,3-Dichloropropylene	0.0		.3	.1
95234	m,p-Xylene	0.0		.1	.1	100637	n-Butylbenzene	0.0		.1	.1
100650	n-Propylbenzene	0.0		.1	.1	95233	o-Xylene	0.0		.1	.1
100648	p-Isopropyltoluene	0.0		.1	.1	100635	sec-Butylbenzene	0.0		.1	.1
100636	tert-Butylbenzene	0.0		.1	.1	95217	trans-1,2-Dichloroethylene	0.0		.1	.1
95220	trans-1,3-Dichloropropylene	0.0		.3	.1						

Zero (0) values indicate that the analyte is not DETECTED. MDL - Method Detection Limit

flags B - This analyte is found in the blank as well as the sample. The blank value has been subtracted.
X - Estimated value. The target compound meets the identification criteria, but is less than the MDL.
H - Compound Detected Q - Qualifying ions present but failed the ion ratio limits.
M - This value is calculated by an alternate Raw DataFile.

* - asterik following the value for Actual days taken indicates the prescribed time for that event was exceeded.

** - the Date Sampled is unknown, therefore timeline calculations can not be performed.

Certified For: Yogesh Kumar
Date: 5-Feb-10
Contact Person: Grant Prill

Business Unit Manager
Environmental Monitoring
Alberta Innovates-Technology Futures
Bag 4000, Vegreville, Alberta
T9C 1T4 (780) 632-8455

mail to: MWWS Buffalo Pound Water Treatment Plant
attn: Dan Conrad
Box 1790
Regina, Sk S4P 3C8

ALBERTA RESEARCH COUNCIL | ORGANICS ANALYSIS DATA SHEET | ARC SAMPLE NUMBER: T10-0106

VOLATILE PRIORITY POLLUTANTS

Contact: MWWS Buffalo Pound Water Treatment Plant
SmpNo : ProjNo : GrpSmpNo :
StaNo : SK05JG0017 StaType:
Comment: Clear Well
Matrix : 9
SmpDate: 19-Jan-10 @ 0750 Samplers..ID1 :
EndDate: @ ..ID2 :

METHOD: IE505
SCAN: VPP

TimeLines (days)		
from sample date		
	Max	Actual
Date Received : 20-Jan-10 by: SS	-	1 --
Date Extracted: 3-Feb-10 by: SS	7	15 *
Date Analyzed : 4-Feb-10 by: SS	7	16 *

Raw DataFile : V0106

TENTATIVELY IDENTIFIED COMPOUNDS // COMMENTS	ESTIMATED CONCENTRATION
No additional compounds reported	

Laboratory's comments regarding this sample:

The following items regarding the sample were recorded. A Yes notation indicates a problem with the specified item.

Inappropriate Sample Container -
Inappropriate Temperature -
Inappropriate Headspace -
Broken / Leaking Container -

This sample was analyzed by GC/MS. An additional GC/FID scan may have been used for screening purposes and to assist with quantitative data analysis.
Estimated concentrations for tentively identified compounds are calculated assuming an equal response to internal standards.
* - asterik following the value for Actual days taken indicates the prescribed time for that event was exceeded.
** - the Date Sampled is unknown, therefore timeline calculations can not be performed.

Certified For: Yogesh Kumar
Date: 5-Feb-10
Contact Person: Grant Prill

Business Unit Manager
Environmental Monitoring
Alberta Innovates-Technology Futures
Bag 4000, Vegreville, Alberta
T9C 1T4 (780) 632-8455

mail to: MWWS Buffalo Pound Water Treatment Plant
attn: Dan Conrad
Box 1790
Regina, Sk S4P 3C8

"results relate only to the item tested"
Please check the mailing information and inform the lab if changes are required.

ALBERTA RESEARCH COUNCIL | ORGANICS ANALYSIS DATA SHEET | ARC SAMPLE NUMBER: T10-0107

EXTRACTABLE PRIORITY POLLUTANTS

Contact: MWWS Buffalo Pound Water Treatment Plant
SmpNo : ProjNo : GrpSmpNo :
StaNo : SK05JG0017 StaType:
Comment: Clear Well
Matrix : 9
SmpDate: 19-Jan-10 @ 0750 Samplers..ID1 :
EndDate: @ ..ID2 :

METHOD: IE340
SCAN: EPP

	TimeLines (days) from sample date	
	Max	Actual
Date Received : 20-Jan-10 by: SS	-	1 --
Date Extracted: 27-Jan-10 by: drc	7	8 *
Date Analyzed : 1-Feb-10 by: drc	21	13 ok
Raw DataFile : E0107		

VMV_CODE	COMPOUND NAME	ug/L	flag	MDL	+\-	VMV_CODE	COMPOUND NAME	ug/L	flag	MDL	+\-
100730	1,2,4-Trichlorobenzene	0.0		.1	.1	100734	1,2-Diphenylhydrazine	0.0		.1	.1
103632	2,3,4,6-Tetrachlorophenol	0.0		.1	.2	100708	2,4,6-Trichlorophenol	0.0		.1	.2
100700	2,4-Dichlorophenol	0.0		.1	.2	100701	2,4-Dimethylphenol	0.0		.2	.2
100703	2,4-Dinitrophenol	0.0		.1	.2	100732	2,4-Dinitrotoluene	0.0		.1	.1
100733	2,6-Dinitrotoluene	0.0		.1	.1	100725	2-Chloronaphthalene	0.0		.1	.1
100699	2-Chlorophenol	0.0		.2	.2	100702	2-Methyl-4,6-dinitrophenol	0.0		.1	.2
100704	2-Nitrophenol	0.0		.1	.2	100738	4-Bromophenyl phenyl ether	0.0		.1	.1
100698	4-Chloro-3-methylphenol	0.0		.1	.2	100742	4-Chlorophenyl phenyl ether	0.0		.1	.1
100705	4-Nitrophenol	0.0		.1	.2	100709	Acenaphthene	0.0		.1	.1
100710	Acenaphthylene	0.0		.1	.1	100711	Anthracene	0.0		.1	.1
100731	Benzidine	0.0		.2	.2	100712	Benzo(a)anthracene	0.0		.1	.1
100716	Benzo(a)pyrene	0.0		.1	.2	100713	Benzo(b)fluoranthene	0.0		.1	.1
100715	Benzo(ghi)perylene	0.0		.2	.1	100714	Benzo(k)fluoranthene	0.0		.1	.1
100739	Bis(2-chloroethoxy)methane	0.0		.1	.1	100740	Bis(2-chloroethyl)ether	0.0		.1	.1
100741	Bis(2-chloroisopropyl)ether	0.0		.1	.1	100748	Bis(2-ethylhexyl)phthalate	0.0		.1	.1
100743	Butylbenzylphthalate	0.0		.1	.1	100717	Chrysene	0.0		.1	.1
100744	Di-n-butylphthalate	0.0		.1	.1	100747	Di-n-octyl phthalate	0.0		.1	.1
100718	Dibenzo(ah)anthracene	0.0		.5	.1	100745	Diethyl phthalate	0.0		.1	.1
100746	Dimethyl phthalate	0.0		.1	.1	100719	Fluoranthene	0.0		.1	.1
100720	Fluorene	0.0		.1	.1	100726	Hexachlorobenzene	0.0		.1	.1
100727	Hexachlorobutadiene	0.0		.5	.1	100728	Hexachlorocyclopentadiene	0.0		.1	.1
100729	Hexachloroethane	0.0		.5	.1	100721	Indeno(1,2,3-cd)pyrene	0.0		.1	.1
100749	Isophorone	0.0		.1	.1	100737	N-Nitroso-di-n-propylamine	0.0		.2	.1
100736	N-Nitrosodiphenylamine	0.0		.1	.1	100722	Naphthalene	0.0		.1	.1
100735	Nitrobenzene	0.0		.1	.1	100706	Pentachlorophenol	0.0		.1	.2
100723	Phenanthrene	0.0		.1	.1	100707	Phenol	0.0		.1	.2
100724	Pyrene	0.0		.1	.1						

Zero (0) values indicate that the analyte is not DETECTED. MDL - Method Detection Limit

flags B - This analyte is found in the blank as well as the sample. The blank value has been subtracted.
X - Estimated value. The target compound meets the identification criteria, but is less than the MDL.
H - Compound Detected Q - Qualifying ions present but failed the ion ratio limits.
M - This value is calculated by an alternate Raw DataFile.

* - asterik following the value for Actual days taken indicates the prescribed time for that event was exceeded.

** - the Date Sampled is unknown, therefore timeline calculations can not be performed.

Certified For: Yogesh Kumar
Date: 5-Feb-10
Contact Person: Grant Prill

Business Unit Manager
Environmental Monitoring
Alberta Innovates-Technology Futures
Bag 4000, Vegreville, Alberta
T9C 1T4 (780) 632-8455

mail to: MWWS Buffalo Pound Water Treatment Plant
attn: Dan Conrad
Box 1790
Regina, Sk S4P 3C8

"results relate only to the item tested"

Please check the mailing information and inform the lab if changes are required. page 1 of 2

ALBERTA RESEARCH COUNCIL | ORGANICS ANALYSIS DATA SHEET | ARC SAMPLE NUMBER: T10-0107

EXTRACTABLE PRIORITY POLLUTANTS

Contact: MWWS Buffalo Pound Water Treatment Plant
SmpNo : ProjNo : GrpSmpNo :
StaNo : SK05JG0017 StaType:
Comment: Clear Well
Matrix : 9
SmpDate: 19-Jan-10 @ 0750 Samplers..ID1 :
EndDate: @ ..ID2 :

METHOD: IE340 | TimeLines (days)
SCAN: EPP | from sample date

	Max	Actual	
Date Received : 20-Jan-10 by: SS	-	1	--
Date Extracted: 27-Jan-10 by: drc	7	8	*
Date Analyzed : 1-Feb-10 by: drc	21	13	ok

Raw DataFile : E0107

ESTIMATED CONCENTRATION

TENTATIVELY IDENTIFIED COMPOUNDS // COMMENTS

No additional compounds reported

Laboratory's comments regarding this sample:

The following items regarding the sample were recorded. A Yes notation indicates a problem with the specified item.

Inappropriate Sample Container -
Inappropriate Temperature -
Inappropriate Headspace -
Broken / Leaking Container -

This sample was analyzed by GC/MS. An additional GC/FID scan may have been used for screening purposes and to assist with quantitative data analysis.
Estimated concentrations for tentively identified compounds are calculated assuming an equal response to internal standards.
* - asterik following the value for Actual days taken indicates the prescribed time for that event was exceeded.
** - the Date Sampled is unknown, therefore timeline calculations can not be performed.

Certified For: Yogesh Kumar
Date: 5-Feb-10
Contact Person: Grant Prill

Business Unit Manager
Environmental Monitoring
Alberta Innovates-Technology Futures
Bag 4000, Vegreville, Alberta
T9C 1T4 (780) 632-8455

mail to: MWWS Buffalo Pound Water Treatment Plant
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Regina, Sk S4P 3C8

"results relate only to the item tested"

Please check the mailing information and inform the lab if changes are required.

ALBERTA RESEARCH COUNCIL | ORGANICS ANALYSIS DATA SHEET | ARC SAMPLE NUMBER: T10-0108

Contact: MWWS Buffalo Pound Water Treatment Plant
SmpNo : ProjNo : GrpSmpNo :
StaNo : SK05JG0017 StaType:
Comment: Clear Well
Matrix : 9
SmpDate: 19-Jan-10 @ 0750 Samplers..ID1 :
EndDate: @ ..ID2 :

PESTICIDE ANALYSIS
METHOD: EM443
SCAN: PESTR

	TimeLines (days)	
	from sample date	
	Max	Actual
Date Received : 20-Jan-10 by: SS	-	1 --
Date Extracted: 22-Jan-10 by: ARJ	10	3 ok
Date Analyzed : 26-Jan-10 by: ARJ	20	7 ok
Raw DataFile : p0108		

VMV_CODE	COMPOUND NAME	ug/L	flag	MDL	+\-	VMV_CODE	COMPOUND NAME	ug/L	flag	MDL	+\-
100667	2,4-D	.014	H	.005	.002	100668	2,4-DB	0.000		.005	.002
100669	2,4-DP	0.000		.005	.002	99888	2,4-dichlorophenol	0.000		.010	.004
99887	4-chloro-2-methylphenol	0.000		.010	.004	97938	Aldicarb	0.000		.100	.020
102929	Aldrin	0.000		.005	.002	106769	Aminopyralid	0.000		.010	.003
100674	Atrazine	0.000		.005	.002	99897	Bentazon	0.000		.005	.002
100675	Bromacil	0.000		.030	.004	100676	Bromoxynil	0.000		.005	.002
100677	Carbathiin (Carboxin)	0.000		.100	.020	99889	Chlorothalonil	0.000		.005	.002
100684	Chlorpyrifos (Dursban)	0.000		.005	.002	99881	Clodinafop acid metabolite	0.000		.020	.004
99880	Clodinafop-propargyl	0.000		.040	.056	100688	Clopyralid (Lontrel)	0.000		.020	.004
100678	Cyanazine	0.000		.050	.008	102609	Desethyl atrazine	0.000		.050	.008
102610	Desisopropyl atrazine	0.000		.050	.008	100679	Diazinon	0.000		.005	.002
103639	Dicamba (Banvel)	0.000		.005	.002	100681	Diclofop-methyl (Hoe Grass)	0.000		.020	.004
102930	Dieldrin	0.000		.005	.002	102618	Dimethoate (Cygon)	0.000		.050	.007
100682	Disulfoton (Di-Syston)	0.000		.200	.050	100683	Diuron	0.000		.200	.250
100685	Ethalfluralin (Edge)	0.000		.005	.002	100686	Ethion	0.000		.100	.020
99898	Ethofumesate	0.000		.005	.002	102613	Fenoxaprop-P-ethyl	0.000		.040	.008
99894	Fluazifop	0.000		.010	.004	99895	Fluroxypyr	0.000		.010	.004
100687	Guthion	0.000		.200	.020	99892	Hexaconazole	0.000		.050	.008
102088	Imazamethabenz-methyl(Assert)	0.000		.050	.044	103141	Imazamox	0.000		.020	.002
102612	Imazethapyr	0.000		.020	.004	99890	Iprodione	0.000		.020	.004
99899	Linuron	0.000		.020	.004	100690	MCPA	0.000		.005	.002
100691	MCPB	0.000		.020	.004	100692	MCPP (Mecoprop)	0.000		.005	.002
100689	Malathion	0.000		.050	.008	99893	Metalaxyl-M	0.000		.010	.004
97934	Methomyl	0.000		.100	.020	102935	Metolachlor	0.000		.005	.002
103631	Metribuzin	0.000		.010	.004	74365	Napropamide	0.000		.020	.004
97933	Oxycarboxin	0.000		.050	.008	103630	Parathion	0.000		.010	.004
100694	Phorate (Thimet)	0.000		.005	.002	100693	Picloram (Tordon)	0.000		.005	.002

Zero (0) values indicate that the analyte is not DETECTED. MDL - Method Detection Limit

flags B - This analyte is found in the blank as well as the sample. The blank value has been subtracted.
X - Estimated value. The target compound meets the identification criteria, but is less than the MDL.
H - Compound Detected Q - Qualifying ions present but failed the ion ratio limits.
M - This value is calculated by an alternate Raw DataFile.

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** - the Date Sampled is unknown, therefore timeline calculations can not be performed.

Certified For: Yogesh Kumar
Date: 29-Jan-10
Contact Person: Grant Prill

Business Unit Manager
Environmental Monitoring
Alberta Innovates-Technology Futures
Bag 4000, Vegreville, Alberta
T9C 1T4 (780) 632-8455

mail to: MWWS Buffalo Pound Water Treatment Plant
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ALBERTA RESEARCH COUNCIL | ORGANICS ANALYSIS DATA SHEET | ARC SAMPLE NUMBER: T10-0108

PESTICIDE ANALYSIS

Contact: MWWS Buffalo Pound Water Treatment Plant
SmpNo : ProjNo : GrpSmpNo :
StaNo : SK05JG0017 StaType:
Comment: Clear Well
Matrix : 9
SmpDate: 19-Jan-10 @ 0750 Samplers..ID1 :
EndDate: @ ..ID2 :

METHOD: EM443
SCAN: PESTE

TimeLines (days)		
from sample date	Max	Actual
Date Received : 20-Jan-10 by: SS	-	1
Date Extracted: 22-Jan-10 by: ARJ	10	3 ok
Date Analyzed : 26-Jan-10 by: ARJ	20	7 ok
Raw DataFile : p0108		

VMV_CODE	COMPOUND NAME	ug/L	flag	MDL	+\-	VMV_CODE	COMPOUND NAME	ug/L	flag	MDL	+\-
99891	Propiconazole	0.000		.050	.008	102614	Pyridaben	0.000		.020	.004
102611	Quinclorac	0.000		.005	.002	99896	Quizalofop	0.000		.030	.004
103824	Simazine	0.000		.010	.004	100695	Terbufos	0.000		.030	.004
74474	Thiamethoxam	0.000		.050	.008	100696	Triallate (Avadex BW)	0.000		.005	.002
103825	Triclopyr	0.000		.010	.004	100697	Trifluralin (Treflan)	0.000		.005	.002
97932	Vinclozolin	0.000		.010	.004	100670	alpha-BHC	0.000		.005	.002
100671	alpha-Endosulfan	0.000		.005	.002	100672	gamma-BHC (Lindane)	0.000		.005	.002
100673	p,p-Methoxychlor	0.000		.030	.004						

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H - Compound Detected Q - Qualifying ions present but failed the ion ratio limits.
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** - the Date Sampled is unknown, therefore timeline calculations can not be performed.

Certified For: Yogesh Kumar
Date: 29-Jan-10
Contact Person: Grant Prill

Business Unit Manager
Environmental Monitoring
Alberta Innovates-Technology Futures
Bag 4000, Vegreville, Alberta
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Regina, Sk S4P 3C8

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ALBERTA RESEARCH COUNCIL | ORGANICS ANALYSIS DATA SHEET | ARC SAMPLE NUMBER: T10-0109

Contact: MWWS Buffalo Pound Water Treatment Plant
SmpNo : ProjNo : GrpSmpNo :
StaNo : SK05JG0017 StaType:
Comment: Clear Well
Matrix : 9
SmpDate: 19-Jan-10 @ 0750 Samplers..ID1 :
EndDate: @ ..ID2 :

POLYCYCLIC AROMATIC HYDROCARBONS
METHOD: - - -
SCAN: PAH

	TimeLines (days) from sample date	
	Max	Actual
Date Received : 20-Jan-10 by: SS	-	1 --
Date Extracted: 25-Jan-10 by: rmr	11	6 ok
Date Analyzed : 25-Jan-10 by: rmr	21	6 ok

Raw DataFile : P0109

GC/MSD SIM DATA

VMV_CODE	COMPOUND NAME	ug/L	MDL flag	VMV_CODE	COMPOUND NAME	ug/L	MDL flag
103142	3-Methylchloranthrene	0.00	.01	103143	7,12-Dimethylbenz(a)anthracen	0.00	.01
103144	Acenaphthene	0.00	.01	103145	Acenaphthylene	0.00	.01
103146	Acridine	0.00	.01	103147	Anthracene	0.00	.01
103148	Benzo(a)anthracene	0.00	.01	103149	Benzo(a)pyrene	0.00	.01
103150	Benzo(b,j,k)fluoranthene	0.00	.01	103151	Benzo(c)phenanthrene	0.00	.01
103152	Benzo(e)pyrene	0.00	.01	103153	Benzo(ghi)perylene	0.00	.01
103154	Chrysene	0.00	.01	103155	Dibenzo(a,h)pyrene	0.00	.01
103156	Dibenzo(a,i)pyrene	0.00	.01	103157	Dibenzo(a,l)pyrene	0.00	.01
103158	Dibenzo(ah)anthracene	0.00	.01	103159	Fluoranthene	0.00	.01
103160	Fluorene	0.00	.01	103161	Indeno(1,2,3-cd)pyrene	0.00	.01
103162	Naphthalene	0.00	.01	107132	Perylene	0.00	.01
103163	Phenanthrene	0.00	.01	103164	Pyrene	0.00	.01
103761	Retene	0.00	.01				

ARC Remarks:

Zero (0) values indicate that the analyte is not DETECTED. MDL - Method Detection Limit

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** - the Date Sampled is unknown, therefore timeline calculations can not be performed.

Certified For: Yogesh Kumar
Date: 28-Jan-10
Contact Person: Grant Prill

Business Unit Manager
Environmental Monitoring
Alberta Innovates-Technology Futures
Bag 4000, Vegreville, Alberta
T9C 1T4 (780) 632-8455

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ALBERTA RESEARCH COUNCIL | ORGANICS ANALYSIS DATA SHEET | ARC SAMPLE NUMBER: T10-0110

GLYPHOSATE, AMPA AND GLUFOSINATE

Contact: MWWS Buffalo Pound Water Treatment Plant
SmpNo : ProjNo : GrpSmpNo :
StaNo : SK05JG0017 StaType:
Comment: Clear Well
Matrix : 9
SmpDate: 19-Jan-10 @ 0750 Samplers..ID1 :
EndDate: @ ..ID2 :

METHOD: EC/16
SCAN: GLYPH

TimeLines (days) from sample date	Max	Actual
Date Received : 20-Jan-10 by: SS	-	1 --
Date Extracted: 2-Feb-10 by: AJ	10	14 *
Date Analyzed : 23-Feb-10 by: DAH	60	35 ok

Raw DataFile : g0110

VMV_CODE	COMPOUND NAME	ug/L	flag	MDL	+\-	VMV_CODE	COMPOUND NAME	ug/L	flag	MDL	+\-
103453	Aminomethyl Phosphonic Acid	0.000		1.000		103626	Glufosinate	0.000		1.000	
103452	Glyphosate	0.000		.200							

Zero (0) values indicate that the analyte is not DETECTED. MDL - Method Detection Limit

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X - Estimated value. The target compound meets the identification criteria, but is less than the MDL.
H - Compound Detected Q - Qualifying ions present but failed the ion ratio limits.
M - This value is calculated by an alternate Raw DataFile.

* - asterik following the value for Actual days taken indicates the prescribed time for that event was exceeded.

** - the Date Sampled is unknown, therefore timeline calculations can not be performed.

Certified For: Yogesh Kumar
Date: 24-Feb-10
Contact Person: Grant Prill

Business Unit Manager
Environmental Monitoring
Alberta Innovates-Technology Futures
Bag 4000, Vegreville, Alberta
T9C 1T4 (780) 632-8455

mail to: MWWS Buffalo Pound Water Treatment Plant
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Please check the mailing information and inform the lab if changes are required. page 1 of 1

Financial Statements - 2010

BUFFALO POUND WATER ADMINISTRATION BOARD
DECEMBER 31, 2010

Deloitte.

Deloitte & Touche LLP
900 - 2103 11th Ave
Bank of Montreal Building
Regina SK S4P 3Z8
Canada

Tel: 306-565-5200
Fax: 306-757-4753
www.deloitte.ca

INDEPENDENT AUDITOR'S REPORT

To the Chairman and Members of the Buffalo Pound Water Administration Board

We have audited the accompanying financial statements of the Buffalo Pound Water Administration Board, which comprise the statement of financial position at December 31, 2010, and the statements of operations, reserve for replacement of capital assets, changes in net financial assets (liabilities) and cash flows for the year then ended, and a summary of significant accounting policies and other explanatory information.

Management's Responsibility for the Financial Statements

Management is responsible for the preparation and fair presentation of these financial statements in accordance with Canadian generally accepted accounting principles, and for such internal control as management determines is necessary to enable the preparation of financial statements that are free from material misstatement, whether due to fraud or error.

Auditor's Responsibility

Our responsibility is to express an opinion on these financial statements based on our audit. We conducted our audit in accordance with Canadian generally accepted auditing standards. Those standards require that we comply with ethical requirements and plan and perform the audit to obtain reasonable assurance about whether the financial statements are free from material misstatement.

An audit involves performing procedures to obtain audit evidence about the amounts and disclosures in the financial statements. The procedures selected depend on the auditor's judgment, including the assessment of the risks of material misstatement of the financial statements, whether due to fraud or error. In making those risk assessments, the auditor considers internal control relevant to the entity's preparation and fair presentation of the financial statements in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the entity's internal control. An audit also includes evaluating the appropriateness of accounting policies used and the reasonableness of accounting estimates made by management, as well as evaluating the overall presentation of the financial statements.

We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our audit opinion.

Opinion

In our opinion, the financial statements present fairly, in all material respects, the financial position of the Buffalo Pound Water Administration Board as at December 31, 2010, and its financial performance and its cash flows for the year then ended in accordance with Canadian generally accepted accounting principles.

Deloitte & Touche LLP

Chartered Accountants

March 16, 2011
Regina, Saskatchewan

Member of Deloitte Touche Tohmatsu

Buffalo Pound Water Administration Board
STATEMENT OF FINANCIAL POSITION
[in dollars]

As at December 31

	2010	2009
FINANCIAL ASSETS		
Cash	**1,866,782**	3,069,455
Accounts receivable		
City of Regina	**582,623**	571,422
City of Moose Jaw	**221,931**	110,790
Other	**114,612**	106,742
Total financial assets	**2,785,948**	3,858,409
FINANCIAL LIABILITIES		
Accounts payable and accrued liabilities	**245,587**	275,037
20% Refundable rate (Note 2)		
City of Regina	**944,619**	1,860,986
City of Moose Jaw	**337,437**	343,990
Surplus refundable (Note 1)		
City of Regina	**428,464**	952,291
City of Moose Jaw	**88,318**	119,375
Employee benefit obligations (Note 5)	**404,397**	389,632
Total financial liabilities	**2,448,822**	3,941,311
Net financial assets (liabilities)	**337,126**	(82,902)
NON-FINANCIAL ASSETS		
Inventory of chemicals	**163,781**	175,996
Prepaid expenses	**4,838**	6,436
Tangible capital assets (Note 6)	**26,886,863**	28,279,286
Accumulated surplus (Note 8)	**27,392,608**	28,378,816

See accompanying notes.

SIGNED ON BEHALF OF THE BOARD

Board Member

Board Member

Buffalo Pound Water Administration Board

STATEMENT OF OPERATIONS

[in dollars]

For the year ended December 31

	Budget (unaudited)	**2010**	2009
REVENUES			
General water rate charges			
City of Regina operating contributions	5,733,000	**5,314,763**	5,348,085
City of Moose Jaw operating contributions	1,248,975	**1,095,517**	1,163,744
City of Regina capital contributions	573,300	**531,476**	534,808
City of Moose Jaw capital contributions	124,898	**109,552**	116,374
	7,680,173	**7,051,308**	7,163,011
Refundable water rate	1,396,395	**1,282,056**	1,302,500
Power charges	262,008	**179,368**	227,718
Miscellaneous water sales	97,251	**85,695**	82,431
Interest	21,520	**16,233**	17,420
Other	7,500	**4,942**	5,052
	9,464,847	**8,619,602**	8,798,132
EXPENSES (Schedule 2)			
Employee wages & benefits	2,621,600	**2,417,999**	2,249,890
Amortization of tangible capital assets (Schedule 3)	1,761,643	**1,761,643**	1,767,769
Utilities	1,725,000	**1,587,998**	1,602,762
Chemicals	1,625,000	**997,080**	1,208,420
Refundable water rate	1,396,395	**1,282,056**	1,302,500
Waterworks assessment	-	**44,921**	-
Equipment maintenance	849,800	**510,048**	484,997
Miscellaneous	212,000	**232,631**	201,569
Laboratory supplies & maintenance	168,000	**122,972**	94,393
Building & ground maintenance	129,300	**93,960**	76,604
Administration	39,500	**37,720**	42,720
	10,528,238	**9,089,028**	9,031,624
(Deficiency) of revenues over expenses before refundable surplus	(1,063,391)	**(469,426)**	(233,492)
Surplus refundable from operations allocated as follows:			
City of Regina		**(428,464)**	(548,644)
City of Moose Jaw		**(88,318)**	(119,375)
Change in accumulated surplus		**(986,208)**	(901,511)
Accumulated surplus, beginning of year		**28,378,816**	29,280,327
Accumulated surplus, end of year		**27,392,608**	28,378,816

See accompanying notes.

Buffalo Pound Water Administration Board

STATEMENT OF RESERVE FOR REPLACEMENT OF CAPITAL ASSETS

[in dollars]

For the year ended December 31

	2010	2009
Balance, beginning of year	**489,162**	228,036
Contributions		
City of Regina capital contributions	**531,476**	534,808
City of Moose Jaw capital contributions	**109,552**	116,374
Interest earned - capital reserve share (Note 4)	**6,793**	2,853
Expenditures from reserve for replacement of capital assets	**(226,841)**	(392,909)
Balance, end of year (Note 8)	**910,142**	489,162

See accompanying notes.

Buffalo Pound Water Administration Board

STATEMENT OF CHANGE IN NET FINANCIAL ASSETS (LIABILITIES)

[in dollars]

For the year ended December 31

	2010	2009
Change in accumulated surplus	**(986,208)**	(901,511)
Acquisition of tangible capital assets	**(403,335)**	(684,439)
Amortization of tangible capital assets	**1,761,643**	1,767,769
Proceeds on disposal of tangible capital assets	**10,000**	-
Loss on the disposal of tangible capital assets	**24,115**	-
Surplus of capital expenses over expenditures	**1,392,423**	1,083,330
Acquisition of inventory of chemicals	**(984,865)**	(1,287,983)
Acquisition of prepaid expense	**(4,838)**	(6,436)
Consumption of inventory of chemicals	**997,080**	1,208,420
Use of prepaid expenses	**6,436**	2,668
Surplus (deficit) of expenses of other non-financial assets over expenditures	**13,813**	(83,331)
Increase in net financial assets	**420,028**	98,488
Net financial liabilities, beginning of year	**(82,902)**	(181,390)
Net financial assets (liabilities), end of year	**337,126**	(82,902)

See accompanying notes to consolidated financial statements.

Buffalo Pound Water Administration Board
STATEMENT OF CASH FLOWS
[in dollars]

For the year ended December 31

	2010	2009
OPERATING ACTIVITIES		
Change in accumulated surplus	**(986,208)**	(901,511)
Add back non-cash item		
Amortization of tangible capital assets	**1,761,643**	1,767,769
Loss on disposal of tangible capital assets	**24,115**	-
Net change in non-cash working capital balances		
(Increase) decrease in accounts receivable	**(130,212)**	43,163
(Decrease) increase in accounts payable and accrued liabilities	**(29,450)**	28,989
(Decrease) increase in 20% refundable rate	**(922,920)**	977,784
(Decrease) increase in surplus refundable	**(554,884)**	571,918
Increase in employee benefits obligations	**14,765**	79,307
Decrease (increase) in inventory of chemicals and prepaid expenses	**13,813**	(83,331)
Cash provided by operating activities	**(809,338)**	2,484,088
CAPITAL ACTIVITIES		
Acquisition of tangible capital assets	**(403,335)**	(684,439)
Proceeds on disposal of tangible capital assets	**10,000**	-
(Decrease) increase in cash position	**(1,202,673)**	1,799,649
Cash, beginning of year	**3,069,455**	1,269,806
Cash, end of year	**1,866,782**	3,069,455

See accompanying notes.

Buffalo Pound Water Administration Board
NOTES TO THE FINANCIAL STATEMENTS
[in dollars]

For the year ended December 31, 2010

1. BASIS OF OPERATIONS

The Buffalo Pound Water Administration Board (the Board) has been formed under a 1951 agreement, amended in 1991, between the cities of Moose Jaw and Regina for the purpose of operating the water treatment facility at Buffalo Pound Lake to provide a water supply to the two cities at cost (the Agreement). Any surplus (deficit) in a particular fiscal year is distributed to (charged to) the cities according to their respective usage.

2. SIGNIFICANT ACCOUNTING POLICIES

The financial statements of the Board are the representation of management and have been prepared in accordance with Canadian generally accepted accounting principles for the public sector, as recommended by the Canadian Institute of Chartered Accountants (CICA). Significant aspects of the accounting policies adopted by the Board are as follows:

Use of estimates

The preparation of financial statements in conformity with Canadian generally accepted accounting principles for the public sector requires management to make estimates and use assumptions that affect the reported amounts of assets and liabilities at the date of the financial statement and the reported amounts of revenue and expenses during the year. Actual results could differ from those estimates.

Employee benefit obligations

Employee benefit obligations relating to severance or retirement benefits are recognized to the extent that they are vested and could be taken in cash by an employee on termination.

Pension benefit obligations

The Board is one of the sponsors of a multi-employer defined benefit pension plan. The Board follows defined contribution accounting under which pension expense is limited to the Board's contributions to the plan. The Board's share of any unfunded pension obligations is not recognized as pension expense.

Inventory of chemicals

Inventory of chemicals are valued at the lower of net realizable value and average cost.

Capital contributions

The funding for capital assets is through one of two means, from the Reserve for Replacement of Capital Assets or through a separate funding agreement between the cities of Moose Jaw and Regina (the cities).

Article 3 of the Agreement between the cities requires an additional contribution from each city equal to 10% of the general water rate for every mega litre of water sold. This contribution funds the Reserve for Replacement of Capital Assets from which capital assets may be funded. For major capital projects that the reserve is unable to fund, a separate agreement between the two cities may be struck in order to provide funding for the project. Contributions from the cities under Article 3 of the Agreement or through a separate agreement are shown as capital contributions for financial statement purposes.

Buffalo Pound Water Administration Board
NOTES TO THE FINANCIAL STATEMENTS
[in dollars]

For the year ended December 31, 2010

2. SIGNIFICANT ACCOUNTING POLICIES (Continued)

Operating contributions

Under the terms of the Agreement, each city pays the Board for water and electricity used based upon the following rates established by the Board:

	2010	2009
General water rate, per mega litre	**204.75**	194.08
Electricity rate, per kilowatt hour	**0.07278**	0.06846

These revenues are recognized as the water is delivered to the cities' water distribution systems. Other revenues are recognized when earned and measurable.

Refundable water rate

Under Article 5 of the Agreement, the Board receives an additional 20% of the general water rate from the cities for every mega litre of water sold. At each fiscal year end, the proceeds of these payments are refunded in proportion to the cities' respective capital investment in the Board.

Financial instruments

The fair value of cash, accounts receivable, accounts payable and accrued liabilities, the 20% refundable rate and the surplus refundable approximates the carrying value given their short term nature.

Tangible capital assets

Tangible capital assets are recorded at cost which includes all amounts that are directly attributable to acquisition, construction, development or betterment of the asset. The cost, less residual value, of the tangible capital assets are amortized on a straight-line basis over their estimated useful lives as follows:

General	
Land improvements	20 years
Vehicles and Equipment	7 to 20 years
Office and Information Technology	5 to 10 years
Infrastructure	
Plants and facilities	5 to 40 years
Roads	25 years

Assets under construction are not amortized until the asset is available for productive use.

Tangible capital assets received as contributions are recorded at their fair value at the date of receipt and also are recorded as revenue.

Leases are classified as capital or operating leases. Leases which transfer substantially all of the benefits and risks incidental to ownership of property are accounted for as capital leases and recorded as tangible capital assets. All other leases are accounted for as operating leases and the related lease payments are charged to expenses as incurred.

Buffalo Pound Water Administration Board
NOTES TO THE FINANCIAL STATEMENTS
[in dollars]

For the year ended December 31, 2010

3. FUTURE ACCOUNTING POLICIES

Liability for Contaminated Sites

In 2010 the CICA issued section PS 3260, Liability for Contaminated Sites. This section addresses the recognition criteria, measurement and disclosure requirements for reporting liabilities associated with remediation of contaminated sites that either are not in use or resulted from unexpected environmental events (such as a toxic spill or natural disaster). The Board will be required to adopt this standard for the year ended December 31, 2015, an impact is not known or reasonably estimable at this point.

4. RESERVE FOR REPLACEMENT OF CAPITAL ASSETS

The Statement of Reserve for Replacement of Capital Assets shows allocated interest to the Reserve of 6,793 (2,853 in 2009). This represents the interest earnings for the year and is transferred in accordance with Article 3 of the Agreement. The interest is calculated by applying the prescribed rate, bank being prime less one and two-tenths percent, to the average monthly reserve balance to a maximum of the actual interest earned on the funds.

5. EMPLOYEE BENEFIT OBLIGATIONS

The unfunded employee benefit obligations accrued at year end are as follows:

	2010	2009
Vacation pay	**150,395**	156,717
Vested termination payments	**254,002**	232,915
	404,397	389,632

Based upon an agreement with the Communications, Energy and Paperworkers' Union, termination payments for union employees vest after 15 years of service or upon retiring at the age of 65 after 10 years of continuous service. The amount payable on termination after vesting is 20 hours pay for each completed year of service.

For out-of-scope employees the termination payments vest after 10 years of service. The amount payable on termination after vesting is the wages the employee would have been paid had the employee worked for a time equal to their unused sick days on termination date. The maximum termination payment to an out-of-scope employee is 78 days pay.

Buffalo Pound Water Administration Board is a member of the City of Regina Civic Employees' Superannuation and Benefit Plan (the Plan), which is overseen by its own Administrative Board. All eligible permanent and probation employees of the Board are members of the Plan. This multi-employer Plan provides defined retirement benefits and is integrated with the Canada Pension Plan (CPP). The Plan provides a lifetime monthly pension based on an employee's years of service and the average of the best three consecutive years of earnings. For 2010 employees contributed 9.42% (2009 - 9.42%) of their earnings below the CPP maximum and 13.96% (2009 - 13.96%) of earnings above the CPP maximum and the Board matches employee contributions. New rates recommended by the actuaries are 12.38% up to Yearly Maximum Pensionable Earnings (YMPE) and 18.34% above YMPE, pending approval of City Council.

Preliminary financial statement projections as at December 31, 2010 indicate the plan had a deficit (unfunded liability) of net assets available to pay accrued pension benefits of 209,006,000 (2009 - 207,251,000).

The Plan is a multi-employer defined benefit plan; therefore neither benefits nor contributions are segregated by employer. The percentage of active Plan members employed by the Board at year end was 0.7%. The Plan managers have been unable to determine the portion of any unfunded liability attributable to each employer. Accordingly, no portion of the deficiency has been recognized as a liability or expense in the financial statements. The Plan has been accounted for using the method appropriate for defined contribution plans and, as such, the

Buffalo Pound Water Administration Board
NOTES TO THE FINANCIAL STATEMENTS
[in dollars]

For the year ended December 31, 2010

5. EMPLOYEE BENEFIT OBLIGATIONS (Continued)

amount of pension expense is equal to the contributions required for the year. Pension costs of 222,042 (190,159 in 2009) based on employer contributions were expensed during 2010.

Buffalo Pound Water Administration Board is a member of the Regina Civic Employees' Long-term Disability Plan (the Disability Plan). Preliminary financial statement projections as of December 31, 2010 indicate a surplus of net assets available for benefits of 13,760,000 (2009 - 11,735,000).

The Disability Plan is a multi-employer plan and consequently, identification of individual employer's assets is not available from the Disability Plan managers. Accordingly, no portion of the surplus has been recognized as an asset or expense reduction in the financial statements. Disability benefits are based on 65% of the member's salary and will be paid either throughout the duration of the disability, until the member elects voluntary early retirement, reaches age 65 or upon death, whichever occurs first. The Disability Plan has been accounted for using the method appropriate for defined contribution plans and, as such, the amount of benefit expense is equal to the contributions required for the year. Member contributions are made to the Plan at a rate of 0.92%, with the employer matching contributions. The Board recorded disability premium costs for 2010 of 18,836 (17,831 in 2009).

Dental and Medical plans are also provided for most employees and are paid for by the Board.

6. TANGIBLE CAPITAL ASSETS

	NET BOOK VALUE	
	2010	2009
General		
Land improvements	**-**	-
Vehicles and equipment	**345,814**	354,904
Office and information technology	**7,961**	8,897
Infrastructure		
Plants and facilities	**26,391,235**	27,798,866
Roads	**-**	-
Assets under construction	**141,853**	116,619
	26,886,863	28,279,286

For additional information, see the Schedule of Tangible Capital Assets (Schedule 3). During the year there were no write-downs of assets (2009- $nil). In addition, there were no assets contributed to the Board (2009- $nil).

Buffalo Pound Water Administration Board
NOTES TO THE FINANCIAL STATEMENTS
[in dollars]

For the year ended December 31, 2010

7. CAPITAL INVESTMENT

The Capital Investment represents the contributions made by each of the cities under Article 3 of the Agreement, as well as those made under separate agreement, which have been used for capital purposes. Each City's investment is proportionate to the amount contributed. For additional information, see Capital Investment (Schedule 1).

	2010			2009
	Regina	**Moose Jaw**	**Total**	Total
Balance - beginning of year	**55,741,491**	**20,955,589**	**76,697,080**	76,304,171
Additions funded by:				
Reserve for replacement of capital assets	**167,136**	**59,705**	**226,841**	392,909
Balance - end of year	**55,908,627**	**21,015,294**	**76,923,921**	76,697,080

8. ACCUMULATED SURPLUS

Accumulated surplus represents the equity (accumulated deficit) of an organization. In determining accumulated surplus, revenues and expenses are recognized as they are earned and incurred, according to Canadian generally accepted accounting principles for the public sector as recommended by the CICA.

	2010	2009
Investment in tangible capital assets	**26,886,863**	**28,279,286**
Reserve for replacement of capital assets	**910,142**	489,162
Employee benefit obligations (Note 5)	**(404,397)**	(389,632)
Accumulated surplus	**27,392,608**	28,378,816

9. RELATED PARTY TRANSACTIONS

Related party transactions, in accordance with the agreement between the cities, are disclosed separately in the financial statements and notes to the financial statements, except as follows:

Included in accounts payable and accrued liabilities is 87,019 (68,658 in 2009) payable to the City of Regina.

Included in administration expenses is an administration fee paid to the City of Regina of 29,100 (27,900 in 2009).

Buffalo Pound Water Administration Board **Schedule 1**

CAPITAL INVESTMENT

[in dollars]

For the year ended December 31

	2010	2009
Balance - beginning of year	**76,697,080**	76,304,171
Additions financed by reserve for replacement of capital assets		
Filter-contactor flow meters	**23,990**	-
Instrumentation drawings	**25,234**	43,009
Chlorine safety upgrades	**14,296**	-
Washrooms and lunchrooms	**-**	246,313
Filter valve replacement	**89,130**	73,611
Lab equipment	**8,167**	29,976
Waterworks assessment	**44,921**	-
Crew cab truck	**21,103**	-
	226,841	392,909
Balance - end of year	**76,923,921**	76,697,080

Distribution of capital investment		
City of Regina	**55,908,627**	55,741,491
City of Moose Jaw	**21,015,294**	20,955,589
	76,923,921	76,697,080

Buffalo Pound Water Administration Board **Schedule 2**

SCHEDULE OF EXPENDITURES

[in dollars]

For the year ended December 31

	Budget (unaudited)	**2010**	2009
EMPLOYEE WAGES & BENEFITS			
Wages - permanent employees	2,077,300	**1,905,944**	1,710,114
Employee benefits - permanent employees	402,200	**375,563**	346,131
Overtime wages - permanent employees	105,800	**81,817**	76,525
WCB premiums	27,300	**17,719**	17,130
Premium pay - permanent employees	-	**13,552**	13,223
Car allowance	6,000	**6,445**	4,920
Clothing & boot allowance	3,000	**2,194**	2,540
Employee benefits - vacation, sick and termination	-	**14,765**	79,307
	2,621,600	**2,417,999**	2,249,890
UTILITIES			
Electricity	1,300,000	**1,117,038**	1,195,425
Natural gas	425,000	**470,960**	407,337
	1,725,000	**1,587,998**	1,602,762
CHEMICALS			
Alum	1,150,000	**714,340**	845,605
Granular activated carbon	210,000	**173,431**	207,011
Chlorine	165,000	**103,582**	106,260
Miscellaneous chemicals	100,000	**5,727**	49,544
	1,625,000	**997,080**	1,208,420
EQUIPMENT MAINTENANCE			
Filtration plant	289,100	**222,331**	188,729
Wastewater system	152,200	**98,584**	106,964
Regeneration plant	192,600	**74,513**	98,760
Pump station	81,000	**30,099**	39,487
Computer & communications	111,400	**45,949**	30,027
High power electrical	10,800	**9,751**	12,267
Pipeline	12,700	**28,821**	8,763
	849,800	**510,048**	484,997

Buffalo Pound Water Administration Board **Schedule 2**

SCHEDULE OF EXPENDITURES (CONTINUED)

[in dollars]

For the year ended December 31

	Budget (unaudited)	**2010**	2009
MISCELLANEOUS			
Insurance	68,000	**62,987**	63,909
General supplies	21,000	**15,340**	35,425
Telephone	16,000	**12,832**	13,327
Professional & membership fees	25,000	**20,516**	20,372
Travel & conventions	23,000	**15,599**	18,578
Maintenance - vehicles	18,000	**25,461**	17,801
Stationary & office supplies	21,000	**18,742**	14,014
Awards & gifts	-	**5,904**	5,480
Advertising	-	**-**	5,095
Education & training	15,000	**28,513**	4,032
Contracted services	5,000	**2,622**	3,536
Tangible capital asset (gain)/loss	-	**24,115**	-
	212,000	**232,631**	201,569
LABORATORY SUPPLIES & MAINTENANCE			
Laboratory supplies	65,000	**53,795**	57,514
Laboratory equipment	40,000	**25,046**	25,874
Contract analytical	8,000	**7,933**	10,320
Accreditation program and research	55,000	**36,198**	685
	168,000	**122,972**	94,393
BUILDING & GROUND MAINTENANCE			
Filtration plant	88,000	**72,444**	53,516
Regeneration plant	12,000	**9,214**	12,441
Lake pump station	29,300	**12,302**	10,647
	129,300	**93,960**	76,604
ADMINISTRATION			
City of Regina administration	30,000	**29,100**	27,900
Audit services	9,500	**8,620**	14,820
	39,500	**37,720**	42,720

Buffalo Pound Water Administration Board **Schedule 3**

SCHEDULE OF TANGIBLE CAPITAL ASSETS

[in dollars]

For the year ended December 31

	General			Infrastructure				
	Land Improvements	Vehicles and Equipment	Office and Information Technology	Plants and Facilities	Roads	Assets Under Construction	**2010**	2009
Cost								
Beginning of year	11,373	924,594	22,833	76,674,670	2,321	116,619	**77,752,410**	77,334,301
Add:								
Additions during year	-	52,989	-	325,112		25,234	**403,335**	684,439
Less:								
Disposals during year	-	86,579	13,468	542,349	-	-	**642,396**	266,330
End of year	11,373	891,004	9,365	76,457,433	2,321	141,853	**77,513,349**	77,752,410
Accumulated amortization								
Beginning of year	11,373	569,690	13,936	48,875,804	2,321	-	**49,473,124**	47,971,685
Add:								
Amortization	-	49,334	936	1,711,373	-	-	**1,761,643**	1,767,769
Less:								
Accumulated amortization on disposals	-	73,834	13,468	520,979	-	-	**608,281**	266,330
End of year	11,373	545,190	1,404	50,066,198	2,321	-	**50,626,486**	49,473,124
Net Book Value	**-**	**345,814**	**7,961**	**26,391,235**	**-**	**141,853**	**26,886,863**	28,279,286